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2 JANUARY 1987

## Worldwide Report

# NUCLEAR DEVELOPMENT AND PROLIFERATION

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WORLDWIDE REPORT  
NUCLEAR DEVELOPMENT AND PROLIFERATION

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## ONTARIO DECLARED NUCLEAR-WEAPONS-FREE ZONE

## Legislative Vote

Windsor THE WINDSOR STAR in English 14 Nov 86 p A8

[Text]

TORONTO (CP) — The Ontario legislature voted Thursday by a wide margin to declare the province a nuclear-weapons-free zone.

But Premier David Peterson — who was not in the house for the 61-9 vote — said that while he supports the non-binding resolution as a moral statement, his government does not plan any moves to give it practical effect.

And Conservative house leader Mike Harris — who, with a majority of his party's members voted for the resolution — said the Tories view it as a symbolic gesture.

The private-member's resolution, proposed by New Democrat Richard Johnston and opposed by only two Liberals and seven Conservatives, calls on the government to prohibit the production, testing and transportation of nuclear weapons and component parts in Ontario.

Manitoba and the Northwest Territories, as well as dozens of municipalities across Canada have previously declared themselves nuclear-weapons-free zones.

"I'm shocked by the result," said Johnston, whose nearly identical resolution in 1983 was defeated by the

Conservative majority government. "I'm really surprised by the strength of our support."

His bill is a statement of principle that does not force the government to take any action. But, he said, the overwhelming decision should mean Peterson cannot ignore the result.

Most of the Liberal cabinet was not in the house for the vote, but Johnston said he was encouraged by the fact two influential ministers — Attorney General Ian Scott and Treasurer Robert Nixon — supported the resolution.

**JOHNSTON AND** spokesmen for several peace and church groups — who applauded in the public gallery when the result was announced — said the resolution was just the start of a campaign to rid the province, and Canada, of nuclear weapons.

The peace movement is growing and will not allow the resolution to "just sit there," Christine Peringer, of the Peace Research Institute of Dundas, Ont., said at a news conference after the vote. "This is just a beginning."

Johnston said he will give the government "a few days to let this sink in." He will then press the premier to

produce legislation to give teeth to the resolution, he said.

He suggested the government could, for example, withdraw provincial funding from Litton Systems, a Toronto company which makes parts for the U.S. cruise missile. It might also offer loans or other incentives for the firm to convert to production of goods not used for nuclear weapons.

Ontario Hydro could be told not to export tritium — a radioactive by-product of the Pickering nuclear-powered generating station — to the United States where it might be used to make weapons.

Peterson said he does not know what can be done beyond the resolution. Some decisions must be made by the federal government.

"I don't have any initiatives in mind at the moment," he said.

CITIZEN Editorial

Ottawa THE OTTAWA CITIZEN in English 18 Nov 86 p A8

[Editorial]

[Text]

Not many Ontario residents will sleep better knowing that the legislature has declared the province a nuclear-weapons-free zone. If ever the bombs start flying, they're not likely to bypass Ontario simply because our politicians have issued a decree.

The private-member's resolution by New Democrat MPP Richard Johnston is little more than a motherhood statement of abhorrence for fearsome weapons of mass destruction. While it calls on the government to prohibit the production, testing and transportation of nuclear weapons and component parts in the province, it is not binding on Premier David Peterson's administration.

Peterson has already said his government has no plans to give the resolution practical effect, but says he supports it as a moral statement, whatever that means.

Other than the most zealous advocates of Mutual Assured Destruction (MAD), few would disagree that the world would be a less frightening place if nuclear arsenals would somehow disappear.

But passing resolutions like this one won't produce that happy state. They just allow us to feel self-righteous without actually doing anything.

Yet because there's a chance voters will take these statements seriously and demand action by their governments, it's important to understand the implications of this disarmament strategy if it were actually adopted.

If every Western government declared its territory free of nuclear weapons, the effect would be unilateral disarmament. (Democracy in the Soviet Union being somewhat less robust, it would be naive at best, and reckless at worst, to assume that the U.S.S.R., inspired by the Western example, would benevolently junk its own nuclear arsenal.)

But perhaps the sponsors of Ontario's resolution really don't expect this. Perhaps they just want to get us out of the grubby business, while we continue to cower behind the American nuclear shield. There's a word for such moral selectivity; it's called hypocrisy.

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CSO: 5220/15

YUGOSLAVIA

KRSKO NUCLEAR POWER PLANT DIRECTOR DISCUSSES PROBLEMS

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 8-10 Nov 86 p 3

[Interview with Janez Dular, general director of the Krsko Nuclear Power Plant, by Zdravka Cicmirko-Pokrajcic: "From Coal to the Atom--To the Candle?"; date and place not given]

[Text] The pressure-water reactor PWR of our first nuclear plant in Krsko is accommodated in a concrete building 60 meters high at the bottom of which, 12 meters below the ground, there is a floating concrete plate 3 meters thick with the reactor vessel, in which 256 hot rods filled with enriched uranium--the reactor's core--have been placed. A third of these 30-mm-thick rods are replaced by new ones every year, and the old ones are "cooled" for a time in the power plant's dump. The floating plate is held together at 20 points by iron rods 20 cm thick which, in the opinion of seismologists, guarantee 100-percent safety against nuclear reaction and the danger of radiation. In case of a disastrous earthquake, the plate would be automatically shut off, and that would prevent the emission of nuclear particles.

Recently the Krsko Nuclear Power Plant has been the topic of many discussions. Many contradictory opinions have been expressed concerning its safety and technology. This was the occasion for our interview with Janez Dular, general director of the Krsko NE.

[Question] Chernobyl--Krskobyl, the joke which was heard this summer in Zagreb and Ljubljana, alludes to the outdated Westinghouse technology which Krsko has and to the domestic running of the nuclear power plant. How much truth is there in that joke?

[Answer] The technology of the nuclear power plant in Krsko is just as up-to-date as it is in all the Framatom and Westinghouse nuclear power plants. To be sure, there are more up-to-date designs. The Westinghouse specialists are working right now on a new design which has not yet been completely developed. But regardless of the up-to-date solutions, the concept is the same, and the customer chooses what is accessible to him. It is the same thing when you buy an airplane. For example, the Douglas conception is in principle the same, but there are modern versions of airplanes, which does not mean that the older model is unsafe for the passengers. Accordingly, it cannot be said that our nuclear power plant is hazardous to human health because it does not have the

most up-to-date technology. After all, what nuclear power plant does have it at this moment, since during the time it is under construction even the newest technology must become outdated to some extent.

As far as what you called domestic attendance, our specialists changed the fuel themselves even earlier. This year, probably under the influence of Chernobyl, there was some reaction to that, and it turns out that everyone is a greater expert than we who work in the nuclear power plant. We are proud of our specialists for being able to perform this complicated job themselves.

If an Accident Occurred at Krsko, It Would Be an Economic Disaster, Not an Ecological Disaster

[Question] The reactor at Krsko shut down at 2332 hours on 31 July. If this was because of regular repairs, would it have been necessary for you to say something about that in a meeting of the Environmental Protection Commission of the SFRY Assembly? On that occasion you said that if an accident occurred at Krsko it would not have the same consequences as the one at Chernobyl.

[Answer] It is not customary to inform the public about the repair of a power plant. It is a fact known to everyone that every year we do repairs and there is no need to make anything of that. Had an accident occurred at Krsko, it would have been an economic disaster, not an ecological disaster. Our nuclear power plant would no longer operate, or it would take quite a number of years to make it able to operate, and there is some question about whether that would be successful. But the radiation would not go into the atmosphere. After all, Krsko is much safer and better protected than Chernobyl.

There are five basic barriers built into our nuclear power plant: the zirconium cladding around the pellets of nuclear fuel, the reactor vessel and the primary circle, the concrete shield around the reactor vessel, the hermetically sealed vessel of the containment, and the reinforced-concrete building of the containment. Separate systems have been built for each physical barrier between the nuclear fuel and the environment, and their main function is to prevent physical damage to that particular barrier. Yet if radionuclides pass through one of them, systems are actuated which reduce their concentration by indirect elimination from that space. The last two barriers are separated by a space where the air pressure is lower. Should there be a penetration of radioactivity into the space of the containment, all the radioactivity would be very effectively removed by means of the systems for cleaning the atmosphere of the space between them. Chernobyl had an altogether different system.

As for the repairs, I might also mention that shutting down the reactor at Krsko has nothing whatsoever to do with a breakdown of the power system; it is pure coincidence that this happened immediately after the nuclear power plant was shut down. This year the repairs took somewhat longer because of certain changes which had not been envisaged. Incidentally, don't hydroplants and thermal electric plants also do repairs?

People Now See Radioactive Clouds When There Is the Slightest Breakdown at a Nuclear Power Plant

[Question] There were some troubles at the nuclear power plant in early July. What were they? Little is known about that. It seems that the doors of the nuclear power plant at Krsko have been closed to newsmen recently. What kind of secrets are you concealing?

[Answer] The doors of the nuclear power plant will remain closed to certain of your colleagues, at least so long as I am director. There are no secrets unless newsmen create them. We had no particular troubles in July. There was a leak in the condenser. That has happened before. Every conventional thermal power plant must also be shut down because of that kind of trouble, and no one asks why the breakdown occurred. Previously when we shut the reactor down, there was no great commotion about it. Not only Chernobyl, but also the anti-nuclear movement which has become widespread in the world, it seems, is having an ever greater impact on our own citizens as well, so that they see radioactive clouds over their heads when there is the slightest breakdown at the nuclear power plant in Krsko.

[Question] To what extent is the steam generator the weak point of our first nuclear power plant, and what is happening with its tubes?

[Answer] This year we once again opened up the steam generator, tested the tubes, and found the situation to be quite good. According to the interpretation of the French specialists, the aging process, because of stress in the material, or what is called stress corrosion, has been slowed down a bit. It might be said that this is the weak point of a nuclear power plant. In the new nuclear power plants built after Krsko the tubes are made of a different alloy. The Germans have made the best changes of material for the tubes, and they have removed this problem from the agenda. We should take advantage of their experience in the future, assuming, of course, that we decide to generate power with atomic energy.

The Connection Between Krsko and Puerto Rico

[Question] A member of the academy from Zagreb says that 30 percent of the 4,674 tubes of the steam generator in Krsko are plugged. What effect does that have on the operation of the power plant at 100-percent capacity?

[Answer] Last year we plugged 20 percent of the tubes, and that did not affect the capacity of the power plant. It is supplying to the network about 630 MW of electric power. Certainly we must be careful that stress corrosion of the tubes does not result in a mixture of primary and secondary water during operation. As a precaution we need to make inspections from time to time and isolate the tubes which have "started." I do not want to get into an argument with a member of the academy, but I know that 30 percent of the tubes still do not affect the capacity of the power plant. I do not claim to be precise, since figures are my weak point.

[Question] Westinghouse was supposed to build a nuclear power plant in Puerto Rico using the same technology as at Krsko, but the U.S. Atomic Energy Commission prohibited the construction. If that is true, to what extent is our nuclear plant really safe?

[Answer] As far as I know, Puerto Rico gave up building the nuclear power plant because it wanted to stay with conventional sources of energy. They also felt that a nuclear power plant with a capacity of 600 MW was large for them. Westinghouse was supposed to build a nuclear power plant in Puerto Rico before Krsko. And as far as the American Atomic Energy Commission is concerned, through the International Nuclear Energy Agency it has received a report on the safety of the nuclear power plant at Krsko.

[Question] You say that Westinghouse was supposed to build a nuclear power plant in Puerto Rico before Krsko. If that job was not abandoned because of the outdated technology, why did the American Atomic Energy Commission seek a guarantee about Krsko's safety?

[Answer] Now that might be called a malicious question from a journalist. I was not there when the contract was concluded with Westinghouse, so that I cannot say to what extent the technology of our nuclear power plant was up-to-date at that point. Nor do I know whether it was intended for Puerto Rico, and please do not put questions to me on that point.

#### Illogical Remarks by Austrians

[Question] The Austrians say that they are getting radiation from Krsko. In July they even sent three telegrams and asked for an explanation as to why the nuclear power plant was shut down. The Austrian consul in Ljubljana was even urged on the point.

[Answer] It is true that the Austrians unofficially offered several million dollars to shut down this project at Krsko. They have been advising us not to build any more nuclear power plants, but they are willing to buy the power that comes from them. There is a Swiss nuclear power plant some 50 km from their border, and there is also the Czech Bohumice, which they do not protest, and Krsko is 90 km from them, and they find that horrible. Where is the logic here? There is no radiation from Krsko.

We regularly send reports to Croatia and Slovenia on the level of radioactivity. To be sure, the reports are a pile of numbers, but anyone who knows how to read them sees that the pollution is considerably below the allowed minimum.

[Question] How about dosimeters? As far as we know, they are often broken.

[Answer] Like any asset, all the dosimeters are never working at any one time. There are six of them in the vicinity of Krsko, and at least three more are to be set up. Their proper operation is checked constantly. Our power plant has been in operation for 5 years now, and there have been no occurrences of elevated radioactivity, and it is one of the reliable and clean sources of

electric power. Take, for example, the Obrenovac Thermal Electric Power Plant and see how much it is polluting the environment.

#### The Question of Whether or Not To Build Nuclear Power Plants Does Not Lie in the Competence of Nuclear Power Specialists

[Question] Thermal electric power plants pollute the environment, but they do not have such lethal waste as nuclear power plants. Where have you been depositing the waste from your power plant?

[Answer] About 4,000 drums each with a capacity of 900 kg are now in temporary storage at Krsko, but the storage facility within the power plant has room for only 9,000 drums. That is why we also will have to find a solution for disposal of nuclear waste as soon as possible. The first mass nuclear phobia in the world occurred because of that waste, but that is a matter for the sociologists and psychiatrists. It seems that that phobia is slowly making headway even among us. It shouldn't, since there truly are no reasons for it.

[Question] It is said that in a certain sense nuclear technology is at a crossroads and that many countries are abandoning such programs for that reason. What do you think, does Yugoslavia need nuclear power plants?

[Answer] As far as I know, Prevlaka, the first in the series which has been envisaged, would be the next. It is said that our coal reserves are large. I do not know about that, on that you should ask the fuel and power specialists. I think that the whole issue about building nuclear power plants has been politicized. The question of whether or not to build nuclear power plants is not up to nuclear specialists. Our job is to say whether a particular site is suitable for such a power plant, to state the price, and to say whether it is safe from the standpoint of security. This has to be compared with other sources of electric power. In fact an examination has to be made as to what is less expensive and more long-term.

If we actually do have such large coal reserves and unutilized hydro potential on rivers like the Drina, then we certainly should think about those sources of electric power and plan nuclear power plants only later. If we decide to take power from atomic energy, nuclear power plants should be built where electric power consumption is high, and that means in the vicinity of the large cities. In this connection we should take advantage of the experience of the Germans and cool the reactors with towers so as to avoid raising the temperature of the water in the rivers. At present the Sava near Krsko is 2° warmer.

To go back to the last sentence of your question--whether or not we need nuclear power plants. We will need them unless we reach agreement on building hydroplants, for which we truly do have large capabilities, if investments in coal mines continue to be what they have been up to now. We could easily have a situation because of such an increase in electric power consumption that we would enter the 21st century in the dark. Then we will have to see by candlelight when we want to reach agreement.

[Box, Col 1]

#### Difficulties With the Steam Generator

In January 1982, trial operation of the nuclear power plant at Krsko was halted to take special measurements and to conduct tests of the steam generator. The tests were requested by Westinghouse on the basis of figures on damage on similar steam generators in nuclear power plants in Sweden and Spain. The system for feeding the steam generator at the nuclear power plant in Krsko was modified on the basis of the measurements in May 1982.

[Box, Col 2]

#### Deceptiveness of the Average Price?

According to the plan, by the year 2011 the output of electric power at Krsko will be 3,900 gigawatt-hours a year, at an average price of 7.78 dinars per kilowatt-hour. If depreciation were computed at 5 percent beginning in the year 2000, when all the investment credits are to be paid off, the average annual generating cost of electric power would be about 7.01 dinars per kilowatt-hour. This year's price, however, is higher, since it contains the unpaid negative exchange rate differences carried over from the earlier period (7,605 million dinars) and unpaid interest on foreign credits carried over from 1985 (13,073 million dinars).

[Box, Col 3]

#### Why It Was Operated Without a Use Permit

The reactor at Krsko was first filled with fuel in May 1981. Up to the end of 1982 the nuclear power plant was operating on a trial basis, and on 25 June 1983 the document on taking over the nuclear power plant was signed in Krsko by the founders and Westinghouse. The permit for operation was also issued, but not the use permit, since the project to protect the Sava River against pollution was not carried out, and Croatia especially insisted on its being carried out.

So far \$998,799,628 U.S. have been invested in this power plant.

[Box, Col 4]

#### Radioactive Waste

In 1 year of operation a nuclear power plant of the type at Krsko produces about 250 m<sup>3</sup> of technical waste which after processing is placed in drums. The radioactivity is only a few hundred curies.

Additional costs are required in processing and shipping radioactive material if it is placed in central storage areas outside the power plant. According to the figures of a sizable number of such storage facilities in the world, the disposal costs amount to 75,000 dinars per cubic meter, or 15,000 dinars per drum.

According to the investment program for construction of the central storage facility to meet the needs of the nuclear power plant at Krsko, the disposal costs are estimated at 0.065 dinar per kilowatt-hour of power produced in prices of last December.

INTER-AMERICAN AFFAIRS

BRAZIL, ARGENTINA AGREE TO BUILD PLUTONIUM REACTOR

PY100234 Buenos Aires DYN in Spanish 2220 GMT 9 Dec 86

[Report by special correspondent]

[Excerpt] Brasilia, 9 Dec (DYN)--On the second day of President Raul Alfonsin's visit to this capital, Brazil and Argentina agreed today to jointly build a nuclear reactor that, according to a reliable source, will use plutonium, a fuel which will make it possible for the two countries to manufacture nuclear explosives even though both governments have repeatedly denied any such intention.

Argentine President Raul Alfonsin and Brazilian President Jose Sarney met for the second time to continue discussing economic, cultural, technological and border integration. The two official delegations also signed important documents related to this integration and these documents include the nuclear agreement.

Diplomatic sources and Brazilian news media have agreed that the accord to build a plutonium reactor using Brazilian and Argentine technology is a significant step toward integration, but it is an even more significant development for the nuclear science of both nations, because the plutonium reactor brings both nations closer to the possibility -- categorically rejected by the two governments -- of building an atom bomb.

Officials of the Argentine National Commission for Atomic Energy [CNEA] have officially denied any intentions to build a plutonium reactor, and explained that the agreement only provides for the construction of a standard fast-breeder reactor of the kind that is already in use in both nations.

However, diplomatic sources and the newspaper JORNAL DO BRASIL have reported that it is indeed a plutonium reactor and plutonium, once processed, is the fuel necessary to manufacture the atom bomb.

Upon being asked, members of the Argentina delegation, who do not belong to the CNEA and who did not want to be named, confirmed that "there is such an agreement" and that it will result in the production of plutonium, although according to these sources this is not the primary objective of the treaty.

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CSO: 5100/2048

ARGENTINA

SIGNING OF NUCLEAR ACCIDENT ACCORD SEEN DOUBTFUL

Buenos Aires AMBITO FINANCIERO in Spanish 24 Oct 86 p 11

[Text] A special conference of the International Atomic Energy Agency held in Vienna at the end of last September approved the texts of two international conventions on early reporting of nuclear accidents and assistance to the countries affected. Argentina played an active role in the drafting of both conventions, but its position was not taken into consideration owing (among other things) to the role played by Brazil, elected for the chairmanship of the task force with the Argentine vote.

Now, it seems at least a topic of debate whether Argentina can sign and ratify both conventions without expressing any type of reservation or condition. The incident disclosed the difficulties persisting in daily coexistence with Brazil in the nuclear area, although, on the Argentine side, the action of the Brazilian representative in Vienna was described as a "personal incident," which does not reflect Itamaray's policy.

The two nuclear conventions are the result of the international disturbance caused by the nuclear accident at Chernobyl and the USSR's delay in reporting on it to the neighboring countries. The accident was "ignored."

This fact upset all the USSR's European neighbors, whether on its borders or not, including the members of the Warsaw Pact. Long before the causes and features of the accident were completely learned, the international machinery was put in motion to reach some type of "umbrella" agreement aimed at ensuring that, in the future, nuclear accidents with effects across borders will be rapidly reported, and that the victimized countries which require it can receive the necessary aid.

Dissatisfaction

The result was the two conventions approved in Vienna, but the terms in which they were ultimately drafted are not satisfactory to the Argentine experts. The spirit of solidarity with which they were originally conceived has vanished, and the real effectiveness of the measures that they call for is also dubious.

The first objection brought up by Argentina at Vienna was that the conventions approved do not cover accidents caused with nuclear weapons, even if their effects extend beyond the borders of the country which caused them. Nor do the documents stipulate the threshold of radiation that determines that a nuclear accident occurring in one country affects a third one; and, furthermore, the decision on whether or not to report it is left in the hands of the originator. In the event that it does report it, the International Atomic Energy Agency will be responsible for retransmitting the alert, but the dissemination of the information relating to the effects on the accident is excluded from the other countries. Finally, and contrary to the usual practice in conventions based on international solidarity, when a country which is a victim of a nuclear accident caused by a third country requests international assistance, it will have to assume responsibility for any damage suffered by those which offer it.

According to the Argentine experts, the approved texts reflect more the concern of the nuclear powers over protecting their military secrets and giving their arms programs precedence over international control than the desire to help reduce the effects of accidents. The same thing holds true of the position of countries possessing major programs for power plants and nuclear fuel, which fear finding themselves in the situation of assuming responsibility for the damage caused to third countries by their own installations.

The texts attained the approval of the assembly in record time, and not because of a special concern among the participants for promptly offering mankind a remedy for the next Chernobyl. According to Argentine experts, there predominated the desire of the nuclear powers to quickly procure an agreement that would benefit them, to which the eagerness of the Brazilian delegate to achieve "success" at all costs contributed.

The situation proved too paradoxical for the Argentine delegation, because, a few months earlier, Itamaraty had insisted on its concern for coordinating the foreign policy on the nuclear field of both countries; and the bilateral agreements for mutual assistance in cases of nuclear accidents signed this very year are based on guidelines quite different from those upheld by Brazil at Vienna, but clearly consistent with the Argentine criticism.

The criticism from Argentina (and other countries, such as France and India) was not totally futile. The nuclear powers, which had insisted so much on the approval of the treaties, eventually found it necessary to offer some type of palliative.

The latter ultimately consisted of statements of intent to the assembly of reporting all accidents, even those not compulsorily reported, which would implicitly include those caused by nuclear weapons. According to the Argentine doctrine, such statements of intent made in the formal confines of an international assembly have the same compulsory nature as a treaty.

But it is not yet clear by what legal device Argentina will be able to assert that doctrine, in the event that it decides to sign and ratify the two Vienna conventions on nuclear accidents. What is, indeed, clear is that there will soon by some screw adjustments made in the Brazilian delegation to the IAEA. The "success" of its nuclear ambassador did not please Itamaraty at all.

ARGENTINA

CNEA DETAILS NUCLEAR AGREEMENT WITH CUBA

PY251905 Buenos Aires NOTICIAS ARGENTINAS in Spanish 1259 GMT 25 Nov 86

[Text] Buenos Aires, 25 Nov (NA) -- The National Commission for Atomic Energy (CNEA) today made it clear that the Argentine-Cuban agreement for cooperation in the peaceful use of atomic energy was not signed during the visit President Raul Alfonsin made to that Caribbean country.

In a press communique, the CNEA pointed out that the agreement, which was initialed in March 1986, was signed on 8 November 1986 by CNEA Chairman Alberto Constantini and by his Cuban counterpart.

Thus, the CNEA countered the criticism which has been made based on the presumption that agreement was signed during Alfonsin's visit to Cuba on 18 and 19 October.

The communique also points out that both sides "will consult each other whenever it is appropriate concerning the implementation of safeguard procedures," that is, control procedures for exports of Argentine materials to Cuba.

The communique states that "if both sides agree to do it this way they will sign with the International Atomic Energy Agency (IAEA) the appropriate safeguard agreements."

This agreement was initialed in March 1986 in Buenos Aires [words indistinct].

The scientific-technical cooperation will cover the following basic aspects:

-- implementation of irradiation techniques to conserve atoms;

-- development and production of nuclear equipment;

-- theoretical and experimental nuclear physics;

-- disposal of radioactive waste;

-- scientific-technical information in the field of nuclear energy, nuclear sciences and techniques;

-- exchange of experiences in the operation, maintenance, and quality control of nuclear power plants;

-- research and prospecting for radioactive minerals;

-- metallurgy and prospecting for radioactive minerals;  
-- radiologic protection and nuclear safety;  
-- chemistry of nuclear reactors;  
-- research reactors;  
-- radiochemistry and production of radioisotopes.

/6091  
CSO: 5100/2045

ARGENTINA

CONSTANTINI DISCUSSES CNEA OPERATIONAL PROBLEMS

PY140012 Buenos Aires NOTICIAS ARGENTINAS in Spanish 1610 GMT 13 Nov 86

[Text] Buenos Aires, 13 Nov (NA)--It was reported today at Government House that after a meeting with President Raul Alfonsin to discuss a draft bill for the restructuring of the National Commission for Atomic Energy [CNEA], Alberto Constantini, chairman of that organization, stated today that "it is impossible to continue operating under the current system of controls imposed by the state organizations."

After the meeting with Alfonsin, Constantini talked to the press and said that according to the draft bill, "we will set up within the CNEA some state companies to deal with the different production areas."

As examples he cited the possible creation of electricity plants, uranium producing centers, and storage areas, commercialization and production centers, radioisotope elements, in addition to companies that will deal with the different areas of production.

He added that these companies "would be grouped under a single management organization, and through the CNEA they would constitute a 'holding' [given in English] that would include the large research and development office that is now under the CNEA. A percentage of the budget would be earmarked for this office."

Constantini added that "17 percent of the CNEA funds are dedicated exclusively to research and development, and 83 percent are dedicated to production activities."

He then justified the proposed restructuring of the organization, stating that the CNEA "cannot continue to operate under the current circumstances with obstacles, difficulties, administrative norms, and the controls imposed by state organizations."

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CSO: 5100/2045

ARGENTINA

NUCLEAR DUMP PROJECT TERMED ELECTORAL ISSUE

Alfonsin Reassures Town on Dumping

Buenos Aires AMBITO FINANCIERO in Spanish 23 Oct 86 p 12

[Text] Yesterday, Alfonsin the politician resorted to a more or less naive ambiguity to reconcile what Alfonsin the president of the republic knows and Alfonsin the party chief wants his electoral clientele to believe. When he stated, literally, that "no nuclear dump that would jeopardize the lives or health of the inhabitants will be built in Trelew or anywhere else in the republic," he was not failing to tell the truth.

It will not be in Trelew, nor will it affect the lives or health of those who may live near (or far) from it, and it will not be an open-air, contaminating dump beyond all control, as it is customarily termed. But as for its existing sooner or later, of that there is no doubt. Moreover, Argentina is one of the most advanced countries in the world, apart from the narrow circle of nuclear powers, in the study of an end storage place for high intensity radioactive waste, as the technicians prefer to call it.

At a distance of 450 kilometers from Trelew, in the middle of the Patagonian plateau (the Middle Sierra), and 50 kilometers from a settlement with 200 inhabitants, called Gastre, the CNEA [National Commission for Atomic Energy] technicians have investigated an underground granite massif several kilometers wide and of similar length, in which, at a depth of 500 meters, headings will be dug in which airtight stainless steel and lead containers will be stored, holding the borated glass pastilles in which the lethal remains of the burned nuclear fuel will be enclosed.

But the storage place is only a study for the time being, although one that is very painstaking and has received the most fervent praise from the international agencies, owing to its safety features. A few years ago, the investment was estimated at about \$1 billion; and its effect on the production cost of nuclear electricity, at a thousandth of a dollar per kilowatt hour generated (currently costing an average of 40 mills).

With three nuclear power plants in operation by the beginning of the 1990's, and perhaps two more under construction by the end of the century, one can,

nevertheless, not discern why fuel reprocessing should be an urgent necessity. And without reprocessing, no storage place is needed: The unprocessed fuel is stored directly under safe conditions and at low cost in the very nuclear power plants in which it was used, without any problems, over a period of decades.

Alfonsin did not, therefore, lie to the citizens of Trelew, but his promise seems more like an electoral pledge than a statesman's judgment.

#### Chubut Locality Favors Construction

Buenos Aires AMBITO FINANCIERO in Spanish 27 Oct 86 p 13

[Text] The official decision not to authorize construction of a "nuclear dump" in Chubut, declared last Wednesday in Trelew by President Raul Alfonsin, in what appeared more like an electoral promise than the considered decision of a statesman, has not satisfied its presumed beneficiaries.

The announcement was presumably intended to win the sympathy of the local populace, even at the cost of creating an unsolvable problem for the rest of the country.

The inhabitants of Gaster, Chubut (the settlement closest to the site selected in the studies for the construction of the nuclear waste storage place) came out in favor of its construction and opposed to the president's announcement.

According to the official agency, Telam, Enrique Carro, communal head of Gaster, remarked yesterday that the installation of the storage place "will bring progress to the area, which could not arrive in any way other than by this means."

In statements made for the television program, "Federal News," carried by ATC, Carro added: "Gaster is isolated in the middle of Chubut Province, and it is very difficult to bring progress to all the localities in the center of the country, because they are situated far from the main routes, railroads, and essential services."

The official added: "The construction of a nuclear storage place in Gaster would create sources of employment and would cause a growth in the population. I think that all the safety features will be present in this nuclear storage place; and therefore we Chubut residents must try not to interfere with this right that we in Gaster have to achieve progress as well."

Carro announced that the pre-feasibility studies are under way for the construction of the nuclear storage place and that, once those studies have been completed, they will be submitted to the Office of the President of the Nation and to the Congress, to be considered and debated with the responsibility that the matter requires.

This is not the first time that the Radical government has had to reverse itself in the area of nuclear policy.

On its timetable, the arrival of the storage place is still very far off; because it will not be necessary until it becomes economical to reprocess the burned fuel of the nuclear power plants. But, when its time comes, it will be essential if we want to effectively protect the entire population from the risk of radioactive contamination. Given its features, whatever be the site on which it is built (in the vicinity of the Plaza de Mayo, or in the Puna de Atacama desert), the storage place should be so safe that it will not entail any risk even for those residing in its vicinity or working at it.

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CSO: 5100/2034

ARGENTINA

BRIEFS

LOAN FOR PERUVIAN NUCLEAR PROJECT--Peruvian Ambassador to Argentina Alfonso Grados Bertorini today announced that Argentina is giving the final touches to a \$5-million loan that it will grant to Peru for completion of the Huarangal nuclear power plant project. The ambassador explained that the credit will be granted on very advantageous terms and that the operation involves Argentina's most significant transfer of technology in Latin America. [Text] [Lima Television Peruana in Spanish 0100 GMT 15 Nov 86 PY] /6091

CSO: 5100/2045

BRAZIL

SCIENTIST CRITICIZES NATION'S NUCLEAR POLICY

PY211500 Sao Paulo FOLHA DE SAO PAULO in Portuguese 19 Nov 86 p A16

[Text] The nuclear power plant Angra I in the municipality of Angra dos Reis (154 km from Rio de Janeiro) remains closed because Furnas Centrais Electricas, owner of the plant, continues testing the diesel generator which presented problems on 23 October, according to reports released by Furnas' public relations office. The same office also said that no date has been set for the conclusion of testing and the return of the power plant to operation. FOLHA has tried to contact Furnas management to obtain further details about the testing and the situation at Angra I, but the public relations office said "this is all the information available."

In the opinion of physicist Ennio Candotti, 44, vice president of the Brazilian Society for the Advancement of Science (SBPC), "the lack of information about Angra I once again demonstrates the need to create an independent organization, approved by Congress, and able to give reliable information to the people every time incidents like this occur." According to Candotti, "what stands out is that Furnas and the CNEN (National Commission for Nuclear Energy) are afraid to release any information," which, in his opinion, "contributes only to reducing the people's trust."

The vice president of the SBPC said that an organization like CNEN "cannot depend on the National Security Council or be subordinated to the military household," as President Jose Sarney decided to do some 20 days ago, "because it is clear that the final objectives of the nuclear program are not peaceful, as has been repeatedly said officially."

"Society expects that the nuclear energy program be strictly subordinated to civilian institutions, and that the scientific research in this area be controlled by a commission that includes independent scientists," Condiotti said. "What we see today, however, is the subordination of the CNEN to the same military sectors that had promoted research in the nuclear area, generating great mistrust about their objectives," Candiotti said.

The vice president of the SBPC said that "the nuclear policy must be adapted to the election results, because it was clearly established that we can no longer allow discretionary acts or adventures of isolated sectors." He concluded by adding that "this is a good opportunity to recall that the question of the facilities at Serra do Cachimbo, designed for nuclear tests, has not yet been properly explained."

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CSO: 5100/2040

BRAZIL

REPORTAGE ON DEFECT IN ANGRA I AUXILIARY EMERGENCY GENERATOR

Cooling System Unit

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 28 Oct 86 p 38

[Text] While a group of 100 ecologists protested before the Angra I nuclear plant facilities Saturday afternoon, the management of the Furnas Electric Power Stations once again found itself faced with the problem of solving a technical defect in its equipment. This time, the problem arose in a diesel generator that serves to maintain the cooling of the nuclear plant in case of an accident, and since the Brazilian experts did not succeed in repairing the equipment, the company was forced to seek the aid of American experts, who arrived at Angra dos Reis yesterday.

The information about this one more accident at the plant, which is known as "firefly" (because of its constant on and off operation), was revealed in Sao Paulo yesterday afternoon by the former minister of Industry and Commerce and current president of Furnas, Camilo Penna, minutes before the opening ceremony of the First Maintenance Congress and the First Exposition of Maintenance Products and Equipment at the Reboucas Convention Center in Sao Paulo.

Camilo Penna said that the nuclear plant has already been authorized by the courts to resume operation (by a vote of 22 to 4, the Federal Court of Appeals overrode the injunction granted by the judge of the Angra dos Reis District, which required that the plant remain shut down until Furnas presented a plan for evaluation of the area in case of an accident). But the return of the plant to the electric system will occur only when the diesel is repaired, the Furnas president declared.

Camilo Penna refused to predict how much time would be necessary for repairs, saying only that "the future belongs to God and Angra will resume operations when God wills." But at the same time, he defended the Brazilian nuclear program, saying that to this day, Angra has not suffered any nuclear accident: "All of the problems we have had have been in the peripheral equipment, as is the case of the generator that stopped operating last Friday night," the Furnas president pointed out. According to him, the defective generator is only one of the five alternative sources of cooling in case of an accident.

The former minister also defended the readjustment of electric energy rates which, according to him, are approximately 40 percent out of phase with the needs of the companies in the electric sector. He explained that the current rates are delaying investments and "shaking the morale of the companies." According to Penna, the country will face serious energy shortage problems in 1987 in the event that the year is hydrologically negative. "Brazil has readied a rationing program that will be put into practice in case of need, along the line of what was done in Rio Grande do Sul last year," explained Camilo Penna.

#### Essential to Safety

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Oct 86 p 31

[Text] The Angra I nuclear plant will not go into operation until the problem of its emergency auxiliary generators, which were tested last week and again showed a defect, is resolved.

Those emergency auxiliary generators are essential to the safety of the plant because they must be activated in less than 10 seconds in case of a total blackout in the region. Since the nuclear plant cannot remain without electric power under any circumstances without the risk of a serious accident and even the meltdown of its nucleus, those auxiliary generators are considered of extreme importance.

Minister of Mines and Energy Aureliano Chaves said yesterday with regard to the Angra I nuclear plant accident that testing "is precisely for that purpose," and the important thing is that the unit did not show any defect after its entry into operation.

8711/9190  
CSO: 5100/2032

BRAZIL

DISSATISFIED NUCLEBRAS DIRECTORS TENDER RESIGNATIONS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 23 Oct 86 p 38

[Text] Rio--The decisions in the nuclear sector have become conditioned by politics and nothing will be done before the 15 November elections in order not to erode the government and not hurt possible candidates of the Democratic Alliance. That fact is causing extreme unhappiness in companies such as Furnas and NUCLEBRAS, and in the latter there is beginning to be an exodus of directors, engineers, and the more highly trained technicians, who are finding easy placement in the labor market.

After the director of NUCLEN, Ronaldo Fabricio, who has already submitted his request for resignation to NUCLEBRAS, yesterday it was the turn of the company's financial director, Hercules Correa, who submitted his request for resignation to company president Licinio Seabra. The director of NUCLEI, David Simon, who reportedly has also submitted his resignation, declared that he is staying at the company purely out of loyalty to and friendship for Licinio Seabra, however, he is reserving his departure until the end of March.

In Furnas, company technicians and directors believe that the Angra I problem will only be resolved after the elections because they have already conducted all the tests and have not obtained licensing from the National Nuclear Energy Commission, an agency that today is connected to the Presidential Palace and has no link with the Ministry of Mines and Energy. In the opinion of those Furnas technicians, all of the tests have been conducted and the plant could be in commercial operation, saving the company \$1 million a day.

The chairman of the National Nuclear Energy Commission, Rex Nazare Alves, denied that the CNEN's position on licensing Angra I was political. He said that the license for operation of the plant will not be granted until the analysis of the tests is completed and that that can take 24 hours or 1 month. "It does not matter; we are concerned with safety and are not in a hurry," Rex Nazare emphasized.

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CSO: 5100/2032

BRAZIL

VEJA VIEWS TRANSFER OF NUCLEAR COMMISSION

PY281918 Rio de Janeiro VEJA in Portuguese 19 Nov 86 p 50

[Text] The idle Brazilian nuclear program, which has been sticking its hands into the public till since the early 1970's without yielding anything in return, a few days ago took a toll within its own ranks with an unexpected spurt of radioactivity. Engineer Xamuset Campello Bittencourt, a member of the National Commission for Nuclear Energy [CNEN] management, resigned because he disagreed with the course set for a delicate aspect of the nuclear issue -- that is, who runs what in this business. He left his post as a result of a decree signed by President Jose Sarney, linking the CNEN to the Presidency of the Republic.

Without positively saying it, he threw that research and control organization into the arms of the National Security Council. As if it needed more vitamins to gain weight, the National Security Council, which is so comprehensive in its actions that it meddles in all kinds of affairs and is so secret in its purposes that it operates underground in a basement of the annex building of the Planalto Palace, swallowed the new pill with satisfaction and simplicity.

General Rubens Bayma Denys, chief of the Military Household of the Presidency and secretary general of the National Security Council, has stated that "linking the CNEN to the National Security Council will not change the country's nuclear policy". Although at first, this seems to be a tranquilizing statement, it makes one fear the worst. It so happens that the Brazilian nuclear policy is based on two agreements -- one with the United States, which resulted in a completed power plant that does not work -- Angra I -- and another one with the FRG, which resulted in an incomplete power plant -- Angra II -- barely a skeleton set up on the Rio de Janeiro coast. It will be difficult, however, for the soldiers, who are inclined toward politics, to avoid the temptation to contribute their input to the nuclear problem, which they have been closely following for the past 15 years -- from afar in some cases, and very closely in other cases -- by contributing secret research, possibly for military purposes. Physicist Luiz Pinguelli Rosa, from the Rio de Janeiro Federal University, who is a persistent critic of the Brazilian nuclear dream, says: "CNEN's transfer to military control appears to me to another step in the race to produce a Brazilian atomic bomb."

Rex Nazare Alves, a civilian nuclear expert who heads the CNEN, contributed to the decision to transfer this agency to the National Security Council. Nazare Alves, who has been at the CNEN since the previous government, is an adviser to the National Security Council who coordinates what is known as the "parallel nuclear program," the ongoing program aimed at giving the country its own technology in the atomic field so as not to depend on knowhow from other countries. The CNEN is deeply immersed in this program, as are military laboratory facilities. "It is a program for peaceful purposes," says General Bayma Denys.

It is not difficult to believe in the peaceful purposes of Gen Denys, because research in the nuclear field can more readily lead to the construction of electricity-generating plants than to the manufacture of atomic bombs. Furthermore, any fear in regard to the latter will be premature in a country that has not yet managed to enrich uranium for use in nuclear plants, which do not require technology as sophisticated as that needed to make atomic bombs. However, the militarization of the Brazilian nuclear program could be disastrous -- and the signs can be seen everywhere. A good example dates back 5 years, when the National Security Council sponsored a senseless international maneuver by smuggling uranium out of the country for Iraq.

The problem becomes more sensitive when one examines the areas in which the National Security Council is having a say. It expresses its opinion on the question of agrarian reform, and everyone knows what has happened in this regard. In the area of informatics, it managed to create a mammoth-sized dispute with the United States, the outcome of which is unpredictable. In one of its meetings, the National Security Council went so far as to discuss the signing of "an international agreement to regulate the activities of the world's countries on the moon and other heavenly bodies." Under this broad agenda of the National Security Council, an agency which, like madmen and Indians cannot be held responsible for their actions, the country's nuclear policy has now been placed. This policy used to be entrusted to the CNEN, under the Mines and Energy Ministry.

A look at the central government budget for next year shows that, under the National Security Council account, \$1.0 billion cruzados is earmarked for research "in the interest of national security." It is known that the Air Force is conducting work on uranium enrichment at an installation at Sao Jose dos Campos, Sao Paulo State, while the Navy is trying to develop nuclear submarines at the Nuclear and Energy Research Institute, in Sao Paulo. If these submarines travel at the speed at which the Angra 1 plant is going into operation, they will be stranded soon after they are christened with the champagne bottle.

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CSO: 5100/2042

BRAZIL

COMMITTEE TO STUDY NUCLEAR INTEGRATION

PY102228 Paris AFP in Spanish 2239 GMT 8 Dec 86

[Text] Rio de Janeiro, 8 Dec (AFP) -- It was officially reported here today that Brazilian and Argentine businessmen of the nuclear sector have created a committee to coordinate an integration program aimed at promoting the flow of nuclear input between the two countries. The program will also seek to increase the flow of Argentine-Brazilian input to third countries.

The Brazilian state-owned company Nuclebras reported that the committee was created on 28 November in Rio de Janeiro, during a meeting between Brazilian and Argentine businessmen and officials of the nuclear sector. On that date, the Argentine-Brazilian working group for nuclear cooperation was holding its 3d meeting in Rio de Janeiro. This group was created within the framework of the Declaration of Iguazu, which Brazilian President Jose Sarney and his Argentine colleague Raul Alfonsin signed on 30 November 1985.

According to Nuclebras, the Argentine-Brazilian committee is made up of two engineering company representatives, two equipment manufacturing representatives, and two assembly plant representatives. Each country has three members in the committee.

The meeting between the businessmen of the two countries was coordinated by members of Brazil's National Nuclear Energy Commission (CNEN) and of Argentina's National Atomic Energy Commission (CNEA).

Nuclebras said that the following Argentine companies were represented at the Rio de Janeiro meeting: Argatom, Techint/Cometarsa, Pescarmona, Conuar-Faes, Evangelista, Tool Research, Invap, Metalurgica Belluci, Enace, and Automacion Aplicada.

The Argentine delegation gave a report on the Argentine nuclear industry to the Brazilian businessmen, and proposed a bilateral integration effort in the nuclear sector, including the standardization of nuclear plant design. The purpose of this proposal is to promote a bilateral flow of supplies and allow the two countries to sell nuclear input jointly to third countries, Nuclebras said.

The Argentine businessmen, [words indistinct] countries, and get ready to supply that growing, large market, Nuclebras added.

The conclusions of the 3d meeting of the Argentine-Brazilian working group for nuclear cooperation have been submitted to their respective governments, which can approve them during the official visit to Brazil that Argentine President Raul Alfonsin began today.

Brazil and Argentina use different types of fuel for their nuclear programs. Brazil uses enriched uranium and Argentina uses natural uranium.

The two countries signed their first bilateral nuclear cooperation agreement in May 1980, after reaching an agreement over hydroelectric development on the Parana River. Bilateral cooperation was strengthened in August 1980, when then Argentine President General Jorge Rafael Videla visited Brasilia and signed a new agreement and two protocols. On that occasion, the two countries signed a contract for borrowing uranium concentrate and a letter of intent to supply Brazil with zircaloy tubes, which are produced in Argentina.

The Brazilian nuclear program has been practically paralyzed since early 1984 because of budget cuts in the public sector. According to recent changes ordered by President Jose Sarney, 2 of the 8 nuclear plants that will be built in Brazil under the terms of the agreement signed in June 1975 with the FRG will be operational in 1992 and 1995.

According to the original timetable for the Brazilian nuclear program, those 8 plants were scheduled to be operational before 1990.

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CSO: 5100/2049

BRAZIL

SEABRA ON STATUS OF PLANT COSTS, FUEL CYCLE MASTERY

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Oct 86 p 31

[Text] The president of NUCLEBRAS, Licinio Seabra, said in Rio yesterday that it will not be possible for Brazil to achieve technological self-sufficiency in the area of reactors with the construction of only two units in the framework of the nuclear program and that, due to the delay in the construction of Angra II and III, these plants will cost the country \$7.8 billion when their construction is completed, or \$3,000 per installed/kilowatt.

In an interview granted to nine German reporters who accompanied KWU president Klaus Berthelt have to familiarize themselves with the Brazilian nuclear program, Seabra admitted that the cost of the Angra II and III plants is abnormal and was occasioned by the financial charges, because the initial period for the construction of those units was 7 years, and 10 years have already elapsed without either of them having been completed.

Klaus Berthelt said he believed in the nuclear program and expressed his satisfaction with President Jose Sarney's decision to continue the project even though at a minimum pace. He refused to make any estimate about the transfer of technology, pointing out only that if the Angra II and III unit had already been built and the Brazilian Government decided to begin the construction of two more units, that transfer of technology would be much greater.

Licinio Seabra declared that continuation of the minimum nuclear program will not provide the technological independence that Brazil is seeking but only a certain progress.

Seabra told the German reporters also that Brazil is not seeking to cover its energy deficit with the construction of nuclear plants and that the basic objective of that program is to provide the country with the know-how to enter the nuclear age in the middle term, in the year 2010, when the nuclear industry should become a valid alternative. Seabra thus emphasized to the German reporters that there is no connection between the deficit or rationing of energy and the construction of nuclear plants because the great goal is only to acquire technological autonomy.

Licinio Seabra denied that the fuel cycle was at a complete standstill, pointing out that some investments are needed to continue the experiments with the first cascade of the centrifugal-jet uranium enrichment method, that reprocessing has been temporarily frozen in view of the fact that that part is not essential owing to the delay in plant [construction]. He added with regard to the conversion of uranium into hexafluoride that Brazil has already developed its own technology.

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CSO: 5100/2032

VENEZUELA

NEW STUDY CENTER FOR LATIN AMERICAN DISARMAMENT, DEVELOPMENT

Caracas EL NACIONAL in Spanish 24 Sep 86 p D-19

[Article by Nelson Rodriguez A.]

[Text] In a meeting of experts held in Geneva to discuss Third World problems related to disarmament, development, and peace, an agreement was reached to create in Caracas a Study Center for Latin American Disarmament and Development. The rector of the UCV [Central University of Venezuela], Edmundo Chirinos, and the adviser to the International Organization of Civil Protection on Atomic Matters, Julio Cesar Pineda, attended the meeting.

A similar organization exists in Africa by resolution of the United Nations, and through that organization our country is able to make guidelines relative to attendance and other pertinent requirements.

Once the idea for the Venezuelan Study Center was approved, the UCV rector informed the diplomatic mission in Geneva so that the proposal could be channeled through the Ministry of Foreign Relations which should take the necessary steps at the United Nations. Also during the meeting an agreement was signed with the World Academy of Social Protectiva [as published; presumably Protection] and with the Institute of Peace Research, for the purpose of exchanging information, research fellows, teachers, and to study in depth this important topic which is of [such] social interest.

Chirinos presented a paper on the role of the university and its commitment to development and to peace. At the same time Pineda presented a paper related to the status of nuclear energy in Latin America, with special reference to Brazil and Argentina, where some sectors have adopted a bellicose viewpoint regarding atomic energy. In contrast with the majority of Latin America, said countries have not signed the Nuclear Non-Proliferation Treaty (NPT).

"Argentina has not ratified the Treaty of Tlatelolco which created the organization (Opanal)," explained Pineda, "and Brazil has not decided upon its involvement." In the same proposal measures were spelled out which could contribute to avoiding a nuclear conflict. Among these are:

- A declaration and commitment not to use nuclear arms and to prevent all nuclear conflict.
- Progressive nuclear disarmament.
- Negotiations and progress toward nuclear disarmament between the USSR and the U.S.
- Guarantee by treaty among the powers not to use nuclear weapons against states that do not possess nuclear weapons.
- Creation of nuclear free zones.
- No deployment of arms within the national territory of other states (1980 United Nations General Assembly).
- Peace in outer space.

On this last point Pineda cited accords which should be respected: the 1963 treaty on the banning of testing in the atmosphere, in outer space, and underwater; the 1967 treaty on the principles that should guide the activities of nations in the exploration of outer space, including the moon and other celestial bodies; the 1979 accord that governs events on the moon and on other celestial bodies. Since 1978 the United Nations has pressed for new accords. In 1978 and 1979 the USSR and the U.S. established bilateral negotiations on anti-satellite weapons systems, but they suspended the talks. Since 1982, the agenda of the Committee on Disarmament has faithfully included this item, having created a special committee in 1985.

Pineda also included a series of notes and historical references regarding the state of nuclear development in Brazil, beginning with its inception in the decade of the fifties, and continuing right up to the most recent events. [It is a reality that has been] outstripped by Argentine development for several years, despite Brazil's ability to count on the necessary uranium for this phase of its nuclear program.

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OFFICIAL INTERVIEWED ON NUCLEAR RESEARCH

JN251422 Cairo AL-AHRAM in Arabic 22 Nov 86 p 3

[By Mahmud al-Qanawati]

[Text] In a comprehensive interview with the paper, Dr Muhammad 'Izzat 'Abd al-'Aziz, chairman of the Egyptian Atomic Energy Commission, explained the importance of the uses of atomic energy in the various fields.

Dr 'Abd al-'Aziz said that although Egypt had established its Atomic Energy Commission 30 years ago — almost the same time as India established its own commission — and had preceded in this field many of the developing countries, including certain states of the region, that now possess great nuclear capabilities, certain problems still hinder its progress. On the other hand, India and Argentina, whose economic conditions are similar to ours, have given atomic energy all their capabilities.

Dr 'Abd al-'Aziz added: In fact, the lack of these capabilities in Egypt has led to the emigration of a large number of competent scientists to the West.

However, the interview with the top official in the Egyptian Atomic Energy Commission has given hope that, despite the financial difficulties it is facing, the commission still has vast capabilities and only needs financial support to establish a major nuclear base.

It is strange that while the world today is concerned about research in nuclear fusion, which is a very advanced stage, the Egyptian commission has so far not been able to obtain the approval and the funds to build a second nuclear reactor to replace the Soviet reactor, which is now outdated and for which there are no spare parts.

Despite suffering from financial and bureaucratic restrictions, the commission has made several important achievements in training cadres and technicians, concluding agreements on the processing of nuclear fuel at factory level, and getting rid of radioactive waste. In fact, the commission has established four centers for various nuclear uses.

Regarding the commission chairman's view of the commission's present situation, achievements, problems, scopes of international cooperation, and future plans and strategies, we first asked

about the commission's achievements in the past 30 years as well as its current major projects.

Dr 'Abd al-'Aziz replied: The Atomic Energy Commission was established in 1955. This was followed in the late 1950's by the establishment of the Atomic Energy Organization in Imshas, where several installations were set up, beginning with the Reactors' Section — which includes, since 1961, the Soviet-made research reactor with a capacity of 2 megawatts — and the Nuclear Science Section, which includes the Van de Graaff Generator with a capacity of 2.5 million electronic volts. This generator is used in the research of nuclear reactors. There is also the Experimental Nuclear Physics Section which includes several other plants. The commission also established the Radioactive Isotopes Section, which undertakes the peaceful use of isotopes in agricultural, industrial, and medical fields; the Biological Radioactive Section, which undertakes the use of isotopes in the biological fields; and the Industrial Radioactive Section, which undertakes the production of atomic equipment and the maintenance of advanced nuclear-powered electronic equipment.

In the early 1960's, the number of scientific sections increased to 12, and the number of researchers also increased. The commission's nuclear scientific base expanded, and this resulted in the establishment of new organizations: the Nuclear Reactors Organization and the Nuclear Materials Organization, which was once the Nuclear Physics Section. In the 1970's, the Nuclear Energy Organization set up several research centers, including the National Center for Research and Radioactive Technology and the old Nuclear Research Center in Inshas, which was the main center and consisted of 12 scientific sections covering all basic nuclear specializations. Later, several other centers were added, including the Nitrons and Reactors section, which uses the research reactors; the Plasma and Accelerators Section, and the Water and Soil Research Section.

The research in the new centers concentrates on three areas:

1. Nuclear power support research: Among the projects started under my chairmanship of the Nuclear Research Center was the

introduction of nuclear fuel technology for the first time in Egypt. A contract was reached to build a nuclear fuel plant. We have already received the equipment and we are now in the process of building this plant. The fuel units will begin production next year at the factory level in the initial stage. The importance of this project lies in the fact that we are drawing up our plan in such a way that Egypt will not fall under the monopoly of any major power with regard to nuclear reactors. This technology is being introduced by means of a small plant that produces nuclear fuel, beginning with uranian oxide powder and ending with the manufacture of the rod used in reactors. This will be followed several years later by the semi-industrial phase. It will then be possible to build an entire nuclear fuel plant after gaining full experience. This is considered an important nuclear plan for backing the Egyptian nuclear program. A decision to build the first nuclear power station must be made soon.

2. The activity of the Nuclear Research Center: This center undertakes practical research and experimental work, mainly in the production and use of radioactive isotopes. The production of isotopes currently takes place through the Soviet research reactor, although it is already outdated and has no available spare parts. Egypt should have obtained another reactor with a larger capacity extending to 20 megawatts.

3. Basic research, which some people consider as a kind of pastime despite its great importance: This research leads to the creation of scientific cadres and expertise familiar with nuclear experiments and research. Other major research is conducted in the Plazma Section, on what is called nuclear fusion, the ionization of gas under certain conditions. This is the opposite of nuclear fission of heavy uranium atoms. Fusion is the merger of heavy hydrogen atoms (deuterium and tritium). This generates a terrific power similar to that generated by explosions on the sun's surface. Such energy has both peaceful and military uses. A great breakthrough has been made in this field. It was once thought that it would take the world 60 years to manufacture nuclear fusion reactors. However, recent results show that the year 2010 will witness the advent of the first experimental nuclear fusion reactor. The distinctive thing about this reactor is that the fuel will be water — from which we obtain heavy hydrogen — and lithium, which is cheap and readily available. Thus, it will not be a strategic item controlled by the major powers as is uranium. Furthermore, this system is free of radioactive waste.

This is why the commission is so concerned about research on nuclear fusion. Egypt has conducted many research projects in this field that were presented to various international forums and conferences. Interest in this field is due to the extreme importance of the subject. Once nuclear fusion reactors become a reality, Egypt will have vast experience in the field.

The commission's Nuclear Research Center employs about 2,000 scientists, experts, and professionals who work as a single integrated team. One of the commission's most important new centers is the National Center for Radioactive Research and Technology in Madinat Nasr. This center, headed by Dr Hamid Rushdi who carries out a first class program, has a huge cobalt unit, a power plant that will be assembled soon, and another cobalt unit that has been in existence for several years and which is carrying out a great mission in radioactive processes, such as sterilizing medicinal and pharmaceutical preparations. This is in

addition to research on improving radiation technology. The importance of the accelerator section is that it is used in treating industrial products such as rubber, car tires, and electrical cables by radiation to improve their quality.

[Al-Qanawati] Any state having radioactive materials and using the atom in its research must have the means to treat radioactive isotopes and materials and dump radioactive waste. What is the commission's position on tackling this problem?

['Abd al-'Aziz] The Atomic Energy Commission is building a radioactive processing plant that contains radioactive material. This material, contained in a shielded building, is treated from a distance to avoid exposure to radiation. The main purpose of the plant is to get rid of low-level and medium-level radioactive waste, reprocess nuclear fuel, and produce certain useful materials such as uranium. The international Atomic Energy Agency signed an agreement on building this plant, which will be a regional one. Work on this plant is about to be completed.

As chairman of the Nuclear Research Center, I concluded a contract with the German side [not further identified] on building a furnace for radioactive waste. This furnace, built in Germany, will be shipped to Egypt soon. The furnace will be used for getting rid of radioactive waste. Other radioactive material will be buried in an area being prepared for this purpose to avert any danger from radioactive waste and isotopes.

[Al-Qanawati] What research have you conducted in the peaceful use of atomic power?

['Abd al-'Aziz] In addition to what I have already mentioned, the commission has published the results of more than 4,000 research projects in major magazines. It also presented this research to international scientific conferences. This research also served as thesis topics for 550 doctorates and 700 MA degrees. This research is prepared by each section in cooperation with other sections in the center.

Research serving certain specific strategies in the commission includes work on nuclear fuel and nuclear fusion, and experiments on such materials as Egyptian steel for pressurized containers. There has also been medical, agricultural, and industrial research, such as the program on acclimatizing foreign livestock to the Egyptian environment, the use of microbiological methods in treating certain materials with radiation, and research into discovering cancerous tumors.

The Egyptian Atomic Energy Commission and the Indian commission were established at the same time. Although Egypt began work in this field before Argentina and other developing and regional countries, these countries now possess great nuclear capabilities. Therefore, we asked about Egypt's nuclear situation and the future of the Egyptian nuclear reactor.

Dr 'Abd al-'Aziz said: We are comparing Egyptian nuclear capabilities to some neighboring countries' great nuclear capabilities. Egypt can build real nuclear capabilities only if the basic needs — foremost, a large research reactor — are provided. Libya, for example, has a new research reactor of 10 megawatts and another large nuclear research center containing one of the newest nuclear fusion systems called (Nucomak). This system

constitutes a base for a future nuclear fusion reactor. Such a system, which includes sophisticated and modern devices for measurement as well as two neutron generators, does not exist in the Middle East.

Egypt should have another reactor for research because Egypt is in the vanguard in this field and has given these countries the know-how. The commission's board of directors has agreed to build a second reactor and Electricity and Energy Minister Mahir Abazah is trying to get sufficient funds for it because he sees this issue as an important step not only in building our nuclear capabilities, but in training cadres for nuclear stations.

Dr 'Abd al-'Aziz added: The commission lacks nuclear cadres because they leave Egypt and migrate to other countries with nuclear capabilities. Egypt should have gotten its first nuclear station in the 1960's when the Commission got its first offer. At that time, the station would have cost only \$35 million. Although it was a small one, it contained a nuclear fuel plant and a complete desalination unit. Today, such a nuclear station costs \$2 billion.

Dr 'Abd al-'Aziz also said: Some people fear nuclear stations as a result of the Chernobyl incident. Such fear is justified because the incident was a serious one. But if we learn the facts about this incident, as well as the difference between the Chernobyl reactor and the Western reactors on which the Egyptian reactor will be modeled, our fears will disappear. The incident took place as a result of a serious human error and the absence of a concrete shield to prevent any leaks or dangerous radiation. The 3-Mile incident in the United States, for example, did not harm anybody because of just such a concrete-shielded building.

Dr 'Abd al-'Aziz added: By the end of the 1950's, India, along with Egypt, began to introduce atomic energy. They faced similar conditions, but India made good progress and became a nuclear power that can produce nuclear fuel and energy. What is true of India is also true of Argentina. The real reason for these two countries' progress in this field is that nuclear research in both countries was provided with every requirement and allowed to move freely to meet its needs, to receive sufficient funds, and to avoid government bureaucracy and other complications.

In Egypt, for example, the commission cannot spend more than 100,000 Egyptian pounds from its budget — if available — to purchase equipment from the local market, yet atomic energy requires many imported spare parts which must be bought with foreign currency. What is also strange is that the commission sometimes gets funds it cannot spend due to similar restrictions. Moreover, there is insufficient foreign currency to open letters of credit. All these complications are due to impotent bureaucratic measures. For instance, we requested a multipowered cyclotron because of its extreme importance in applied sciences, in strategic areas, and in research, but we haven't gotten it yet.

There is an urgent need for us to build our nuclear capabilities, but this will only take place gradually. Egypt must have a nuclear power station with a modern nuclear safety device, a scientific infrastructure, a nucleus for producing nuclear fuel, a facility for disposing radioactive waste, and technical and scientific personnel. All these form a basis for a nuclear industry. Only after

obtaining these things can we talk about Egypt's nuclear capabilities.

[Al-Qanawati] This year, a number of errors were made as a result of misusing radioactive materials. How is the commission planning to avoid such mistakes?

[‘Abd al-'Aziz] All the errors were personal errors and the commission has tackled them. In the cobalt unit case, the necessary measures were taken to ensure that no radiation dangers occur. The unit was then transferred to Inshas for storage.

Regarding Egypt's supervision and protection system for radioactive isotopes and sources, an agreement was reached in coordination with the Health Ministry. The present law defines the prerogatives of the Atomic Energy Commission, but sometimes difficulties crop up as a result of misapplication. However, efforts are being made to coordinate between the two sides.

On the other hand, a list of radioactive sources and isotopes is being drawn up, and instructions for their use, application, and importation have been issued. This was stressed by former Health Minister Hilmi al-Hadidi who devoted special attention to this matter. I must point out that the commission is in possession of a very important project that was approved by the Higher Committee for Economic Policies and Affairs. This project calls for monitoring radioactivity in various places. Radioactivity will be monitored in 12 places, and the results will be automatically transferred to a data-collecting center in Cairo and will be fed into a computer. With this system, we will be able to monitor the radioactive picture constantly and record any increase in radioactivity.

[Al-Qanawati] What dangers are posed by nuclear-powered ships passing through the Suez Canal?

[‘Abd al-'Aziz] The commission's views in this matter are very clear: the passage of nuclear-powered ships through the canal should be discouraged. The inherent dangers are more than we can face at present. In order to allow these ships to pass through the canal, we must take the precautions of a full-fledged emergency plan.

[Al-Qanawati] It was recently reported that Israel possesses nuclear arms. Did this come as a surprise?

[‘Abd al-'Aziz] Of course, what was reported on Israeli nuclear arms capability did not surprise those who knew Israel's nuclear capability and its long history of efforts to strengthen its nuclear power. All this had been known. Israel had a reactor whose main task was to produce plutonium, which is the nuclear fuel for the atomic bomb. Israel possesses all the capabilities to produce atomic bombs and has laboratories to train cadres in all fields. Its universities and institutes have nuclear research centers working with the aim of realizing the same strategy of building nuclear power — be it in terms of nuclear materials, nuclear weapons, or nuclear technology. Israel is also working in the field of nuclear fusion. One of the published secrets is that Israel possesses a thermo-nuclear weapon. This means that it possesses hydrogen bombs. This is not far-fetched because Israel's resources enable it to have them. Israel is not working alone. It

is supported by specialized scientific powers and expertise from advanced nations. It is also cooperating with South Africa.

My plan is based on three points:

1. Continuing the promotion of the nuclear programs by supporting the nuclear fuel program and the dumping of radioactive waste.
2. Exerting our utmost to obtain for research purposes a second nuclear reactor with at least a 15-megawatt capacity.
3. Revising our calculations in terms of the commission's plans forsaking the small amount of money we obtain from the state. We must pool this money to promote definite and feasible programs with effective results. We have done a great deal of basic research and cadre preparation. We must start research on the applications and realize a clear-cut strategy.

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CSO: 5100/4605

GANDHI TELLS OFFICERS NUCLEAR OPTION MAY BE REVIEWED

Calcutta THE STATESMAN in English 29 Oct 86 pp 1, 9

[Text] NEW DELHI, Oct. 28--The Prime Minister has called upon the Defence services to revise both attitudes and training systems. There was the need for development of a new work ethos all along the line so that the men could cope with the new equipment being introduced.

Mr Gandhi also made specific mention of the urgency to improve the standard of flight safety, when addressing the first-ever joint conference of senior officers of the Army, Navy and Air Force here today.

He wanted the services' planning to take an integrated approach to reduce overheads and make projects and services cost-effective.

India does not possess any nuclear weapon, he made it clear, nor do we wish to produce one. But if the country is faced with a situation when nuclear weapons are present across the border, its various defence options and postures would have to be reconsidered, he pointed out.

The conference, Mr Gandhi said, was a step in the right direction and would facilitate a comprehensive view being taken of the Defence requirement. Such an approach was necessary in the current environment; the Army, Navy and Air Force should be considered as one fighting force.

He congratulated the service personnel on their performance and said the nation had absolute faith in them. The Prime Minister praised the work of the Defence research and development organization.

Reviewing the security scenario in the region, Mr Gandhi said that it remained a matter of regret that the proposal to make the Indian Ocean a zone of peace had yet to succeed. It was for the super powers to take more positive steps towards that goal.

Mr Gandhi said the presence in the ocean of naval ships from distant nations remained a source of worry. No possible threat from anywhere in the region could be ignored when planning our defence strategies, he felt.

While taking note of the induction of increasingly sophisticated weaponry into Pakistan, he said he was confident that the Indian armed forces had the competence, capacity and expertise to meet any challenge. He regretted that Pakistan had made no serious efforts to normalize relations.

Turning to Sri Lanka, Mr Gandhi said he was hopeful of an accord being reached in view of the latest proposals currently under discussion. An end to the troubles there would pave the way for the urgently-needed peace.

Regarding the domestic scene, the Prime Minister maintained that a determined action by the police and State Governments had produced results in Punjab and the terrorists were on the run. There was the need for a greater vigil now, since they might attempt something desperate. He was confident that terrorism would soon be brought to an end.

He cautioned against the situation in the hills of North Bengal and observed that both the Gorkha National Liberation Front and the CPI(M) were indulging in violence. The problems of the GNLF were largely developmental and psychological, he felt and was of the view that attempts should be made to bring those people into the mainstream of national life. The situation would aggravate if they were alienated he felt.

/12379  
CSO: 5150/0050

## DISCLOSURES OF PAKISTAN NUCLEAR CAPABILITY DISCUSSED

Bombay THE TIMES OF INDIA in English 7 Nov 86 p 7

[Article by K. Subrahmanyam]

[Text]

THE disclosures in *The Washington Post* by Bob Woodward that Pakistan has tested an implosion trigger device for its nuclear weapons programme and has enriched uranium 235 to 93.5 per cent will come as a surprise only to those in this country who have been wilfully looking away from the unmistakable evidence of sustained Pakistani efforts to reach nuclear weapons capability over the last ten years. Such persons have been both articulate and influential in various positions both in the government and outside.

Following the military debacle in 1962, President Radhakrishnan spoke of our credulity and negligence. Prime Minister Nehru admitted, after the Chinese aggression, that we had been living in an unreal world. Those who do not learn the lessons of history will be condemned to live them again. The attitude of sections of our elite, on the question of Pakistan going nuclear tends to expose this country to the risk of yet another humiliating experience as happened in 1962.

Bob Woodward is not an ordinary reporter. He contributed to Nixon's downfall with his disclosures on Watergate. His links with U.S. intelligence agencies are well known. He has now stated that a special national intelligence estimate exists to the effect that Pakistan will have a small nuclear arsenal at a future date and that this estimate was made earlier this year. Since then Pakistan has carried out a nuclear trigger device test and U.S. intelligence

reports indicate that it has achieved 93.5 per cent uranium enrichment, 90 per cent enrichment is quite adequate to make the bomb.

**Trigger Device**

Last year John Scali, of the American Broadcasting Corporation had disclosed that Pakistan had carried out a trigger device test. Two years ago, Leslie Gelb had reported that the Chinese had passed on the design of their fourth bomb test to Pakistan. Jack Anderson, who brought to light the secrets of Washington special action group at the time of Bangladesh war in 1971, has revealed that intelligence gathering and access facilities for U.S. aircraft were being obtained in Pakistan and the U.S. arms package for that country was in the nature of a price. These are journalists of highest possible ability in the U.S.A. and they are not the kind of individuals who can be used for disinformation by the U.S. government or agencies.

Pakistani attempts at making clandestine purchases of the necessary items such as krytrons, X-ray flash cameras and at sending nuclear scientists as artillery officers to buy X-ray flash cameras and be trained in studying explosion wave effects have been unmistakable signals of Islamabad's intent. Though the Pakistan government has repeated *ad nauseam* that its programme was peaceful in intent — an assurance willingly and eagerly accepted by the credulous and the negligent in this country — it never bothered even to tell the world what

that peaceful programme is. On the other hand, every now and then, Dr. A. Q. Khan has openly declared that he is in a position to make nuclear weapons if his government required it of him. The U.S. government has, in every annual certification, recorded its serious concern about Pakistan's unsafeguarded nuclear programme, but has merely stated that Pakistan does not possess a nuclear explosive device. To those who understand strategic language this has meant that Pakistan has not connected up the last wire in its explosive device or weapon. Those who do not want to face the reality alone can find solace in the U.S. certification.

Bob Woodward has now quoted a senior official directly involved in monitoring the Pakistani programme as saying "this administration would not come down on Pakistan if we found a bomb in Zia's basement." In fact, Washington sent such a signal to Islamabad in 1981 when it waived the Symington amendment, thereby making Pakistan the only country to receive such a special and generous treatment. This too cannot be much of a surprise. The U.S. has co-existed with an Israel which has built up an arsenal of 200 nuclear bombs. Though *The Sunday Times* published pictures of the underground Dimona plant a few weeks ago, it has been common knowledge that Israel has been in possession of a nuclear arsenal for well over fifteen years. In fact by threatening to bring their nuclear arsenal into the open the Israelis have been able to pressure the U.S.

to provide them with unconventional weaponry technologically vastly superior to those the Arab states possessed.

### Pentagon Study

Recently a Pentagon commissioned study on small nuclear forces (Israel, Pakistan and South Korea) concluded that all these countries were anti-Soviet in orientation and therefore their nuclear forces would make life difficult for the Soviet Union and not for the U.S. This speaks of a U.S. willingness to live with a nuclear Pakistan. This too cannot be a surprise. In the past America had been opposed to acquisition of nuclear weapons by the Soviet Union, Britain, France, China and Israel and in every case learnt to adjust itself to the reality once the country concerned went ahead.

The U.S. has known that hundreds of Pakistani scientists and engineers had been working for well, over ten years on nuclear research which the Pakistan government had not been able to fit into a peaceful framework in spite of repeated challenges. It should have been obvious that they were bound to get somewhere towards their goal after 10 years of efforts to develop a nuclear weapons capability. The clandestine attempts at getting krytrons and X-ray flash machine were unmistakable evidence of Pakistani intent. Yet the U.S. let off Nasir Ahmed Vaid, the man who attempted to smuggle out krytrons. It did not come down on Pakistan for trying to send nuclear scientists as artillery officers to study X-ray flash machine techniques. In the light of all this only the most of gullible could have any faith in the non-proliferation commitments of the U.S. Unfortunately in India we have them in plenty.

In June both Pakistani and U.S. officials confirmed that the Soviet Union had sternly warned Islamabad that it should desist from its efforts to build a nuclear weapon and it would be doing so at its own

peril. Within two days the Reagan administration told the Soviet Union to keep its hands off Pakistan. As Woodward points out, this in effect made the U.S. administration a protector of the Pakistani programme and according to his sources, the Pakistanis may have interpreted the administration's remarks as approval.

On the nuclear proliferation issue the U.S. and the USSR are not adversaries but partners. The two countries have regular consultations and pursue a common strategy in the non-proliferation treaty review conferences. Therefore it is quite obvious that the USSR would have given a direct warning to Pakistan only because it was convinced that there was no more point in taking up the issue of Pakistani proliferation with the U.S. than the Israeli one. The U.S. dropped even the pretension of being interested in non-proliferation when it told the USSR to keep its hands off Pakistan.

The U.S. is determined to press ahead with its Star Wars programme and the USSR will be compelled to follow suit. The U.S. would like to monitor closely the Soviet efforts. The U.S.-Iran relations are sinking to a new low. The U.S. needs monitoring facilities in Pakistan to eavesdrop on both the Soviet Union and Iran and to keep the Soviet SDI efforts (if the USSR feels compelled to compete with US) under surveillance. Hence the promise of AWACS to Pakistan and monitoring facilities for the U.S. in Pakistan, as Bob Woodward discloses.

It should now be obvious why Pakistan would not agree to the Indian proposal in the draft of peace and friendship treaty that neither country should give any bases or facilities to other powers. According to an article in Pakistani paper *Muslim* of October 30 by the U.S. journalist, Lawrence Lifshultz, an access agreement for the U.S., giving host country clearance in Pakistan was believed to have been exchanged as far back as 1982.

### Increasing Peril

The only reasonable assessment from what is listed above is that Pakistan is on the verge of attaining a nuclear weapons capability and the U.S. has been a not too unwilling accessory to this development. By providing access and monitoring facilities and permitting U.S. AWACS to fly over Pakistan, Islamabad is exacting two prices — that the U.S. should look away from its nuclear weapons capability and should give it the AWACS. Those in the country who have been accepting facile explanations in respect of Pakistan's nuclear intentions and U.S. non-proliferation commitments despite overwhelming evidence to the contrary have managed to project an image of this country as lacking in will and being, amateurish in its capacity to assess and totally gullible. Unless steps are taken to correct this image, we shall be entering a period of increasing peril.

There is no more time to lose. This country has no options left. We have to prepare our bombs in the basement. We have to take steps to counter the threat posed by AWACS which will look deep into our territory and, as it were, strip us naked. Simplistic one dimensional thinking may confuse people not familiar with the harsh international realities into believing that India cannot launch on a bomb-in-the-basement effort without giving up its crusade against nuclear weapons. That is not so. Only a Soviet Union equipped with a vast arsenal could make the revolutionary proposals it has to eliminate nuclear weapons. As Gandhiji wrote: "Forgiveness adorns a soldier. But abstinence is forgiveness only when there is the power to punish. It is meaningless when it pretends to proceed from a helpless creature.. A mouse hardly forgives a cat when it allows itself to be torn to pieces by her." By keeping away from a nuclear weapons capability, India does not in any way make herself credible in the fight against the nuclear weapons.

/9274  
CSO: 5150/0059

## POLICY IN LIGHT OF PAKISTAN NUCLEAR CAPABILITY DISCUSSED

Madras THE HINDU in English 12 Nov 86 p 1

[Article by G. K. Reddy]

[Text]

NEW DELHI, Nov. 11

It has been established quite conclusively by Indian experts, after checking and re-checking all available information, that Pakistan had tested in September a triggering mechanism for making nuclear weapons.

The successful test took place at an undisclosed location in Baluchistan after a series of clandestine trial runs with hardly half a dozen persons in the Pakistan Government knowing anything about it.

An even more disquieting development is that Pakistan, which has enough enriched weapon-grade uranium already in its possession, has fabricated the components of a crude Hiroshima type bomb which could be put together at short notice.

It appears to have mastered the technology of making the bomb but has evidently chosen to keep one step away for the time being from actually putting these components together and testing a nuclear device, because it does not want to embarrass the U. S. and risk a sudden suspension of American economic and military assistance.

### No longer a secret

It is no longer a secret that Pakistan now possesses both the designs and materials for making nuclear weapons at a politically appropriate moment. The gas centrifuge uranium enrichment plant at Kahuta near Islamabad, which is not subject to IAEA supervision, has the capacity to produce U-235 of requisite purity of over 90 per cent for use in nuclear weapons.

It is also exploring the plutonium route for acquiring the capability to build another type of bomb by setting up a reprocessing facility known as the New Labs near Rawalpindi, in addition to the older one at Chashma along the Indus river on the border of the North-west Frontier Province. The two plants together would be able to yield enough plutonium-239 for making at least one bomb a year to begin with before a bigger plant is built in due course.

### In a difficult position

A neighbouring country like India which is naturally concerned at this development is finding itself placed in a difficult position in determining its own response to meet the threat of a nuclear Pakistan. It cannot be said in the prevailing situation that Pakistan possesses the bomb, but it cannot be said either that it has not yet developed the capacity to put together a device at short notice.

The country's nuclear policy has gone through different variations since Independence. In the initial stages, Nehru regarded the bomb as an unmitigated evil and pledged that India would never acquire nuclear weapons. But Lal Bahadur Shastri reinterpreted this commitment to imply that, though his Government had no intention of making the bomb, he would not commit the future generations to abjure it altogether, since it would be wrong on his part to attempt to lay down an irrevocable policy for all time.

After China acquired nuclear capability and Pakistan started entertaining nuclear ambitions, Indira Gandhi who authorised the 1974 test kept her options open without embarking on a weapons programme. Mr. Rajiv Gandhi, too, has been following more or less the same policy, but he is obliged to reappraise this policy to keep the country ready to exercise the choice at some point.

But unfortunately, there has been no serious internal debate within the Government to assess the Pakistani threat and come forward with a credible plan of action for facing it. The Chiefs of Staff of the armed forces have not so far conducted a serious study on the role of nuclear weapons in the context of sub-continental wars or regional conflicts in future. The armed forces have tried to duck the issue by taking the stand that this is essentially a matter for high political decision, while the politicians who believe in civilian supremacy felt that the defence establishment should not be given an opportunity to conjure visions of a nuclear holocaust to press for more conventional arms or amenities for the armed forces.

There is thus an element of unreality about the brave talk of keeping the powder dry and exercising the nuclear option at the right moment. It is common knowledge that India has the ability to overtake Pakistan quite easily in the nuclear race once the decision has been taken by the Government. And India's nuclear scientists are not sitting idle watching helplessly Pakistan's efforts to make the bomb in one form or the other in the not too distant future.

### **Allegations denied**

PTI reports:

The Defence Ministry today categorically denied recent media reports that India has amassed troops near its Western borders for major manoeuvres.

A spokesman for the Ministry said routine exercises were, however, conducted in various areas in the winter months. He explained that where such exercises were carried out near the borders, prior intimation was given to Pakistan.

Such intimation, the spokesman assured, would be provided should any exercise be held close to the border in the coming months.

/9274  
CSO: 5150/0060

PAKISTAN ATTEMPTED PURCHASE RAISES QUESTIONS

Madras THE HINDU in English 30 Oct 86 p 9

[Text]

LONDON, Oct. 29.

Pakistan seems to have made considerable technical progress in its secret nuclear weapons programme, according to information gathered by Western nuclear experts who have been keenly observing the country's efforts to acquire a 450 kV X-ray flash machine used as a trigger for nuclear bombs.

A recent attempt by Pakistan to buy an industrial camera has been frustrated by the United Kingdom as British officials felt that the camera was for developing nuclear weapons.

The Pakistani enquiry was for a 450 kV flash X-ray machine and an associated high speed camera. British officials were put on their guard because the enquiry seemed like a substitute for an order made in U.S. last year when the Pakistan army artillery school tried to buy a flash X-ray machine from Hewlett Packard.

The U.S. Government angrily cancelled that order when two men sent for training were discovered to be employees of the Pakistan Atomic Energy Commission.

The order in the U.K. was placed by the Pakistan ordnance factory at Wah, west of the capital Islamabad. This was another source of anxiety for officials as it is believed that the con-

ventional explosive trigger for a Pakistani atomic bomb is being designed by the Pakistan Atomic Energy Commission.

The British Government used its influence to stop the order before changing the export control regulations. Work at the atomic weapons research establishment at Aldermaston showed that a 450 kV X-ray machine could be used to design nuclear bombs.

Pakistan may now try to buy the flash X-ray machine directly from its Swedish manufacturer Scandiflash. But the company, which had supplied similar equipment to Israel, said it had not been approached, according to the *Financial Times*. A Swedish official responsible for export controls said his country was aware of the position and the situation was being kept under review.

The Pakistan Embassy here reported its usual denial that Pakistan's nuclear research was for making a nuclear bomb.

This incident, involving equipment that are not normally covered by export controls, is likely to lead to change in regulations in Europe and North America to stop the sale of similar equipment to other nuclear threshold States, such as India and Israel.—PTI

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CSO: 5150/0051

PAKISTAN MAY SEEK ALTERNATIVE TO DENIED PURCHASE

Bombay THE TIMES OF INDIA in English 1 Nov 86 p 8

[Editorial]

The British refusal to supply a flash X-ray machine to Pakistan does not mean that this would put a stop to Pakistan's pursuit of nuclear armaments. It may however slow it down for a brief while. Flash X-ray machines are crucial to nuclear weapons development programmes. They are used to take split-second photographs through solid materials going through very rapid change and are therefore ideally suited to observe dummy nuclear cores as they undergo compression following the detonation of a nuclear-weapon triggering package. Such machines have played a key role in the Swedish and French nuclear programmes as they permit verification of whether or not the triggering mechanism is working as designed. It is fairly well known by now that Pakistan has been trying to purchase these machines on the international market. Indeed, Pakistan managed to purchase a flash X-ray apparatus from Sweden in 1982. But at the intervention of Washington, Sweden at that time had been persuaded not to supply the operating manuals and spare parts needed for the machine which apparently has been sitting idle.

Pakistan continued its search for the X-ray flash machine know-how when in August last year it attempted to purchase such a machine from Hewlett-Packard of the U.S. It was considered to be too small to be used for nuclear purposes and was ostensibly meant for calibrating artillery guns. But U.S. officials had opposed the sale on the ground that the training to be provided for the small machine was the same as that needed to operate the larger machine obtained from Sweden in 1982. The two officials scheduled to be sent for training also turned out to be employees of the Pakistan atomic energy commission.

The latest attempt to buy the machine from Britain then is the third by Pakistan to somehow get the requisite know-how. But the lack of a flash X-ray apparatus or the know-how to operate it does not mean that nuclear weapons triggering package tests cannot be carried out at all. There are alternatives to using a flash X-ray machine for verifying the effectiveness of triggering nuclear weapons packages. And Pakistan may well look for these alternatives.

## PAKISTAN NUCLEAR DEVELOPMENT LEAVES INDIA NO CHOICE

Bombay THE TIMES OF INDIA in English 5 Nov 86 p 8

[Editorial]

The revelations in *The Washington Post* that Pakistan has twice detonated a high explosive device this year — the second as late as the third week of September — will surprise only those in this country and abroad who have sought to minimise the extent of Islamabad's nuclear ambitions and the zeal and the resources it has deployed to realise them. Even they will have to concede that the *Post's* story is far too precise in its details and the sources it quotes far too authoritative to be brushed aside with a limp wave of the hand. The successful detonation of the high explosive device marks a dramatic leap forward in Pakistan's efforts to build a nuclear weapon. This, coupled with U.S. intelligence reports that the Pakistanis have managed to enrich uranium to 93.5 per cent at its atomic plant at Kahuta near Islamabad when only a 90 per cent level is required to make a bomb, should make it abundantly clear that Pakistan has now well and truly become a nuclear weapon power in all but the name. Any other conclusion will only serve to deceive ourselves and the world at large that these breakthroughs do not significantly change the security climate in the Indian sub-continent.

In retrospect it is obvious that India has in fact been a victim of this deception. New Delhi sometimes conveyed the impression that it was willing to give the benefit of the doubt to all those who vouched for Pakistan's nuclear innocence. This is particularly true of the United States which has gone on record again and again to affirm that Pakistan's nuclear programme poses no military threat. As late as October 27, President Reagan had given a written assurance that Islamabad "does not possess a nuclear explosive device." Earlier Mr. Reagan had warned that U.S. aid to Pakistan would be jeopardised if any uranium were enriched beyond 5 per cent. These assurances, it is now plain, were meant to hoodwink India to prevent it from initiating any legitimate action to counteract Pakistani moves. And yet New Delhi should have known better. It had it on the authority of no less a person than the head of the Kahuta project, Dr. Abdul Qader Khan, that when a country has the wherewithal to enrich uranium to three per cent it can enrich it to 90 per cent or more. Nor was it a secret that

to this end Islamabad had sought, and presumably obtained, cooperation from several countries, including China and France. Finally, the Pakistanis themselves were telling anyone who care to listen that they had already developed a triple delivery system for nuclear bombs — the Mirage III fighter bombers, the Chinese A-5 fleet and especially the F-16s. In the face of such incontrovertible evidence. India has no alternative other than to mobilise such resources as may be required to push through an accelerated nuclear weapons programme. This is a hard decision to take for a country which is in the forefront of the campaign to rid the world of nuclear weapons. But there is no other way to check the efforts of the rulers in Islamabad and their patrons in Washington and Beijing to destabilise the Indian sub-continent.

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CSO: 5150/0053

MOSCOW PRESSES INDIA TO ACCEPT NUCLEAR POWER PLANT

Madras THE HINDU in English 26 Oct 86 p 1

[Article by G.K. Reddy]

[Text]

NEW DELHI, Oct. 25.

The Soviet Union is pressing India to accept its long-standing offer of a nuclear power plant on attractive financial terms, so that an official announcement can be made during Mr Gorbachev's visit to Delhi next month as a notable example of increased Indo-Soviet economic cooperation.

But those dealing with nuclear issues in the Government are not too keen on having this Soviet plant for technical reasons, since it would be using enriched uranium while all other nuclear power stations in the country built by India would be based on natural uranium.

After the bitter experience that India has had with the U.S. which unilaterally went back on its contractual obligation to supply enriched uranium fuel for the American-built Tarapur plant, the Indian Atomic Energy Establishment has been very wary of entering into another such agreement with any country for fuel supplies to run it. As India does not have its own enrichment facilities, the acceptance of the Soviet offer which is subject to comprehensive safeguards with built-in pursuit clauses would certainly serve as a constraint on the country's indigenous development of nuclear technology even for peaceful uses.

But at the political level there is a strong lobby within the Government which sees no harm in accepting the Soviet offer if only to relieve the country's acute power shortage. The initial Soviet offer for a giant plant of 1,000 megawatts has been modified to comply with India's requirements and the two reactors that are to be supplied would have enough safety standards to make doubly certain that there is no risk at all of a Chernobyl type of accident.

Moreover, the Soviet Government has come forward with a very tempting financial package that will not only take care of the entire cost of equipment but also generate enough rupee funds to meet the local expenditure on the construction of this mammoth nuclear power plant. The two items together which would be in the range of Rs. 1,000 crores would be adjusted in a phased manner into the annual trade plans.

As an additional incentive, the Soviet Union has offered to build a giant hydro-electric plant in the Tehri-Garwal region in Uttar Pradesh, which will set the pattern for the development of the tremendous river waters potential of the Himalayas estimated at nearly 70,000 megawatts. A good bit of equipment of this hydro-electric plant will be manufactured by the BHEL and other Soviet-aided plants.

The Prime Minister, Mr. Rajiv Gandhi, has not yet committed him to one way or the other,

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CSO: 5150/0049

**ARGUMENT FOR PURCHASE OF SOVIET NUCLEAR PLANT 'FLAWED'**

**BK091229 Bombay THE TIMES OF INDIA in English 30 Oct 86 p 8**

(Editorial: "An Unacceptable Offer")

[Text] There are reports that the Soviet Union is again pressing the government of India hard to buy a nuclear power plant from it. This is a long-standing offer, but it would appear that the Soviets have now backed it with an attractive financial package since they are keen to present the deal as an outstanding example of increased cooperation between the two countries. It has also been reported that there is a lobby in New Delhi which favours the Soviet offer on the ground that it would help relieve the current power scarcity in the country. However, its argument is badly flawed. To start with, nuclear energy is not the best means of relieving electricity shortages in situations of acute peaking power (as distinct from base load) scarcity which atomic stations are just not designed to meet. Secondly, the Soviets have reportedly offered two reactors of the VVER-440 type, i.e., pressurised light water reactors each with a capacity of 440 MW. Apart from the fact that these can, in no way, be integrated into the Indian nuclear power programme, based on the Candu heavy water reactors, it is plain that the VVER-440 is an outmoded technology, going back to the late Sixties which the Soviets have themselves replaced by a superior and larger 1000 MW design. There is every reason to believe that even the modified 440 MW design remains marred by deficiencies from the safety point of

view, in particular, the excessive reliance of its containment on a pressure suppression pool. Thus, none of the 12 reactors reportedly under construction in the USSR is a VVER-440; and after Chernobyl, even its exports to Soviet allies are proving difficult.

Thirdly, and this really clinches the issue, the VVER reactors burn enriched Uranium which this country lacks the capacity to manufacture. The import of such reactors would thus make this country dependent, for an indefinitely long period of time, on the USSR for fuel supplies. As the example of Tarapur shows, such dependence tends to be further compounded by numerous conditions attached to the supply. Going by the experience of India's imports of heavy water from the USSR in the Seventies, there is nothing to suggest that the Soviet Union will be easier to deal with than the U.S., in matters nuclear. Besides, there is another negative lesson to be drawn from Tarapur. The haste with which the Department of Atomic Energy went in for the American plant in the Sixties just to demonstrate that nuclear technology, even if imported, can work, was incompatible with a healthy emphasis on the indigenous development of that technology and proved something of a setback to such efforts. Clearly, if nuclear technology is to prove itself in this country, it must do so on the basis of indigenous effort. Shortcuts via the West or the East will not do.

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CSO: 5150/0062

## AEC CHAIRMAN INTERVIEWED ON NUCLEAR POWER

Madras THE HINDU in English 24 Oct 86 p 12

[Text]

MADRAS, Oct. 23.

The Chairman of the Atomic Energy Commission, Dr. Raja Ramanna, said today he was confident the country would achieve the nuclear power programme target of 10,000 MW by 2,000 A.D. provided enough funds were made available.

In an interview to THE HINDU here, Dr. Ramanna said everything depended on funds and resources: "If industry is ready, we are ready." A total installed capacity of 10,000 MW of nuclear power by the turn of the century was possible if "you are confident of giving me the money."

Replying to a question on whether any more sites had been chosen for setting up nuclear reactors of standardised 235 MW type or 500 MW capacity, he said the Atomic Energy Commission had given the report to the Union Cabinet on the selected places and the Cabinet would announce them.

Dr. P. K. Iyengar, Director of the Babu Atomic Research Centre, Bombay, said the Cabinet would choose the places from out of the sites selected for setting up nuclear reactors.

Dr. Ramanna, who was on a three-day visit to Madras, said his visit was mostly connected with the Institute of Mathematical Sciences, Madras. Besides, he had come to meet the scientists of Madras Atomic Power Station (MAPS), Kalpakkam. The first unit of MAPS was working well. MAPS-2 was awaiting clearance from safety experts and should be in operation again in a week. The second unit of MAPS was shut down on August 14 as two spent fuel bundles were stuck in the fuel transport system. They have now been removed.

**On schedule:** The fast breeder test reactor programme at Kalpakkam was also proceeding according to schedule, including the conduct of tests.

Replying to a question why something or the

other was going wrong with the units of the Tarapur, Rajasthan or Madras atomic power stations, Dr. Ramanna said the second unit of the Rajasthan Atomic Power Station was working well. "It has beaten records. It had been working for six months continuously. We stopped it for servicing."

On the decision to shut down RAPS-1 permanently, he said it was the first prototype reactor built in the country. He added, on a note of complaint, nobody, however, wrote about the efficient functioning of RAPS-2.

The second unit of 210 MW capacity of TAPS was experiencing a small gasket problem, which would be overcome in two or three days. (The second unit at Tarapur was under shut-down from Sunday.)

He was more than ever convinced that nuclear power was the only way to solve the power problem of the country. India had chosen the best type of reactor, the natural uranium fuelled pressurised heavy water type. "It is inherently safe and ideal. And it is very efficient in the use of materials."

Dr. P. K. Iyengar said all countries not producing enough electricity were going in for nuclear power. These included France and Japan. The meeting of the International Atomic Energy Agency in the last week of August had wholeheartedly approved of nuclear power. The participants had resolved that nuclear energy was a "must." Only countries like Sweden, which could afford to buy oil could bypass nuclear power, Dr. Iyengar said.

Dr. Ramanna warned that if developing countries missed out on nuclear energy, they would miss the second industrial revolution. He claimed that there was "fantastic" support for setting up nuclear power units at Kaiga in Karnataka. Worries related only to questions like land acquisition but there was no opposition to the setting up of the reactors at Kaiga.

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CSO: 5150/0048

## IMPORTANCE OF GREENPEACE NUCLEAR SAFETY REPORT NOTED

Bombay THE TIMES OF INDIA in English 1 Nov 86 p 8

[Article by Praful Bidwai]

[Text]

**T**HE chairman of India's Atomic Energy Commission, Dr. Raja Ramanna, said at a conference of the International Atomic Energy Agency in Vienna four weeks ago that the real issue, particularly for the third world, was not whether to have nuclear power or not, but how to enable those who did not have nuclear power to gain access to it. He also urged IAEA member-states to pay greater attention to rectifying (the) negative trend represented by "a rise in anti-nuclear movements" and plans of some countries to wind down their nuclear programmes.

Delegates representing the western nuclear industry were more discreet. They had apparently decided that it was impolitic, in the wake of Chernobyl, to keep on asserting that atomic energy was safe; it was wiser to concede that it posed serious safety problems, and to argue that they could be solved.

The far-sighted among nuclear energy advocates have refined that approach. While conceding that Chernobyl was an event of grave significance, they have concentrated on differences between the RBMK design of that plant and the other commonly prevalent reactor types. This was evident at the post-accident review meeting of the IAEA in August at which the Soviet academician, Mr. Valery Legasov, presented a remarkably self-critical report on Chernobyl.

**Basic "Defects"**

Western nuclear experts were quick to pounce on select facts in the

report. They proceeded to argue that their reactor designs are qualitatively superior to the Soviet RBMK design which uses graphite in the core and light water to cool it. Thus, the British emphasised basic "defects" in the Soviet design and quickly went on to defend their own graphite-moderated but gas-cooled reactors. The thrust of their criticism of the RBMK design was what is called its "positive void coefficient," a reactor characteristic which reinforces a power excursion (a sudden surge in power output) which increases the volume of bubbles in the coolant water in the core.

The Americans for their part laid great stress on the role of the graphite in the RBMK reactor; U.S. reactors do not use graphite at all. They also played down the role of water: All U.S. reactors are light water-cooled. (The British, naturally, said little about graphite). The French spoke about the problem of containment (concrete domes in which reactors are enclosed) and the role of "operator error": the Soviet technicians had violated at least six rules at Chernobyl.

The Canadians, equally expectedly, spoke of essential "design differences" between their heavy water-moderated and-cooled Candu reactors and the RBMK. Unlike the Americans, however, they refrained from going into the role of water. The Soviets, for their part, consistently maintained that each reactor type has its advantages and disadvantages and that is futile to single out any one type for criticism.

This "civil war", as a commentator has called it, within the nuclear industry has one important lesson. The sum of technical criticisms of the different reactor types adds up to a scathing indictment of the technology of using heat from nuclear fission to get water boiling into steam which drives a turbine to generate electricity. Whatever the materials used in construction, whichever the coolant (or moderator), and whatever the configuration of the core, problems of safety and the potential for a catastrophic accident, involving explosions, core meltdowns and releases of large quantities of radioactivity remain inherent to nuclear reactors everywhere.

Environmentalists have always recognised this; indeed, they have long emphasised the danger nuclear reactors represent. Since Chernobyl, several high-quality technical studies have been published that show that hazards remain generic to nuclear reactors. Among the most significant of them is a report prepared for Greenpeace by the Hanover-based Gruppe Oekologie (GO).

The report, written by a panel of 16 independent nuclear experts from seven different countries, cogently argues on the basis of a two-volume, 400-page-long analysis, that for all their differences in design, all reactor types depend on very complex, active systems for their control and regulation and are far from being inherently safe; that their cores contain large amounts of energy, highly toxic radioactive materials and chemically reactive substances which are liable to be released quickly if safety systems fail; and that safety systems are indeed liable to fail.

### Constant Threat

The consequence is that "accidents will happen" and that there is no way of guaranteeing the containment of radioactivity releases; nor has there been any attempt so far to build containments "to withstand all possible accident conditions." And hence, "accidents with containment failure will have catastrophic and far-reaching consequences, both in terms of health effects and land contamination." Chernobyl for all its severe consequences was not the worst possible accident in terms of

radioactivity releases: much larger releases are possible from all reactor types. Thus living with nuclear energy "implies living with the constant threat of severe radioactive contamination."

The GO report traces the genealogy of different nuclear reactor types including pressurised (light) water reactors (PWRs) of U.S., West German, Japanese, French and Soviet make (global total 166), boiling water reactors (BWRs) of U.S., Japanese and Swedish origin (total 74), pressurised heavy water reactors of the Candu variety (23), British

graphite-moderated and gas-cooled reactors (25), as well as the Soviet RBMK variety (total 26). These cover 90 per cent of the world's 350 operating power reactors.

All these types have developed out of early military reactors built partly for plutonium production and partly for submarine propulsion; they remain bound by the constraints of their decades-old design principles. Nevertheless, these reactor types are technologically mature and have "more or less reached the limits of their development and improvement; they are as good as they can get.

The report convincingly establishes that contrary to industry claims, all reactors are marked by serious hazards, inadequate safety, extreme complexity of reactor support systems, low reliability and poor containment. From the Indian viewpoint, the most interesting analysis in the report pertains to the Candu type on which this country's nuclear programme is based. It has been argued that Candu are safer and cannot undergo core meltdowns because of their relatively low power density and operating pressures and temperatures.

### Crack Dangers

The report, however, shows how the pressure tube design involves the dangers of tube cracking and weakening and implies greater length, surface area and complexity of the primary coolant piping. Along with on-load refuelling, this increases the chances of a loss-of-coolant accident (LOCA). The Candu reactor has, like the RBMK design, a *positive void coefficient of reactivity* and hence a

LOCA will lead to a power excursion which, along with SCRAM failure, can cause a meltdown with a breach of containment. The natural uranium heavy water combination has "serious negative safety implications" and necessitates the use of large quantities of zirconium in the core with a potential for violent zirconium-steam reactions: besides it results in large inventories of extremely toxic tritium.

"A probabilistic approach to safety has been taken at the expense of common-mode and cross-linked faults, and the record of the industry indicates persistent failures... and, in general, an over-reliance on containment as the final bulwark against large releases," says the GO report. However, after Chernobyl it is now established that containment domes, however thick, are no bulwark. The steam explosion, one of three major events, that took place in Chernobyl's unit 4 had a force equivalent to 90 tonnes of dynamite — 50 times greater than that necessary to blow up any concrete dome. Although the nuclear industry had earlier projected the chances of steam explosions as one in a thousand meltdowns (which in turn has a probability of less than one in a million;) it is now clear that such analyses have little scientific meaning.

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CSO: 5150/0052

EDITORIAL URGES BUILDING ON NUCLEAR ENERGY BASE

Madras THE HINDU in English 6 Nov 86 p 8

[Editorial: "Building on the Nuclear Energy Base"]

[Text]

THE EMPHASIS PLACED by Dr. Raja Ramanna, chairman of the Atomic Energy Commission, and other leaders of the programme on the current strengths and future of the activity in India is timely and must be endorsed without vacillation. Chernobyl-related public concern supervened on a situation in which attitudes towards nuclear energy were becoming increasingly mixed in society; today it is clear that the Indian nuclear energy establishment must be prepared to face increasingly tough questions and criticisms from outsiders on the economic, technological and safety aspects of the field. But this doesn't mean that the sniping, day in and day out, from an assortment of opponents who share some kind of fundamentalist philosophical antipathy to nuclear energy—and nuclear power in particular—is very intelligent. Some of the adversarial criticism has performed a useful service in sensitising people outside and within the field to the safety factor and the real hazards. In a quite different (and an extremely constructive) way, the International Atomic Energy Agency has risen to the challenge of responding to the new realities concerning safety in the post-Chernobyl period. Much more requires to be done at the country programme and plant levels, including in India, but the unscientific fears and prejudices that anti-nuclear lobbies are working overtime to spread must not be allowed to cause vacillations in public policy. The Indian atomic energy programme has made impressive strides in many areas over the past decade, even if it needs to overcome its well-known deficiencies and weak spots—notably in the delivery of power on a reliable basis to the users.

In terms of a broad indigenous technological base and a self-reliant capability, India is

ahead of all other developing countries with the possible exception of China (which is ahead in the uranium enrichment and heavy water production field). It is a well-constructed and versatile programme—Involving a progressive R&D effort and also diversified applications in industry, agriculture and health where the initial far-sighted investments are beginning to pay off handsomely. If in terms of nuclear power economics the record is (especially in areas such as heavy water production) arguable, this doesn't at all substantiate the sweeping assertion by some that the programme is a white elephant. The construction, commissioning and operation of nuclear power plants must be placed on a more rigorous "commercial industrial pattern", as Dr. Ramanna noted in his recent New Delhi press conference. But the very idea of going to the public in a fairly big way for financial support (through bonds) suggests that a nuclear power programme with improved norms of efficiency and financial accountability will be batting on a very good wicket.

Still the fact remains that India is committed to installing 10,000 MWe of badly needed nuclear power generating capacity by the end of the century, and the gap between target and likely achievement (going by the modest results obtained to date) looks formidable. If the resources constraint which the programme has begun to encounter is brought seriously into the picture, the plan of reaching 10,000 MWe from a low base in a matter of 13 years looks quite unrealistic—unless it be that the programme of indigenous development on the pressurised heavy water reactor (PHWR) road is supplemented in a major way by imported light water reactors using enriched uranium, such as the system offered by the Soviet Union which is under political consideration. There are apprehensions within the nuclear energy establishment that such as-is-available imports which do not really fit into the technological plan for nuclear energy—and certainly not into the current fuel cycle strategy—will put pressures on the very self-reliant thrust that has brought nuclear energy in India a long way over three decades. The scientists and engineers who have, over the years, given so much of their labour and enthusiasm to this crucial national programme must be taken along in any new directional thrust that bureaucrats or political leaders in high places might be contemplating.

/9274  
CSO, 5150/0058

## PAPERS REPORT NUCLEAR SCIENTISTS' PRESS CONFERENCE

## Weapons-Grade Uranium Capability

Calcutta THE TELEGRAPH in English 5 Nov 86 p 1

[Text]

New Delhi, Nov. 4: India has acquired the capability to enrich uranium. Dr Raja Ramanna, Atomic Energy Commission chairman, said today that India can enrich uranium to "whatever level one requires." About 90 per cent enriched uranium is considered weapons-grade material.

Addressing a press conference here, Dr Ramanna said the Bhabha Atomic Research Centre was already enriching uranium on a pilot scale. Indian scientists had studied all methods of enrichment and were capable of producing any desired percentage, indicating that the country had the capability to make weapons-grade uranium.

This is the first official acknowledgement of India's ability to produce weapons-grade uranium. Dr Ramanna, however, did not explain why India was still importing enriched uranium for its Tarapur power plant, which requires only three per cent enrichment.

**Pak capability:** On Pakistan's progress in acquiring nuclear capability, Dr Ramanna said Pakistan had built up a small capability. He said: "If all centrifuges (used for enriching uranium) are working satisfactorily, they may have progressed. But we have no information about

how well or how many of their centrifuges are working."

The Barc director, Dr P.K. Iyengar, who also addressed the press conference, described reports about detonation of a high-explosive nuclear device by Pakistan as a misrepresentation of an earthquake, agencies report.

Dr Iyengar said if it was an explosion, as reported by *Washington Post* today, seismic signals would have been recorded in India. The earthquake occurred on September 19 at 5.15 pm in Pakistan and this was misinterpreted as a nuclear explosion.

The newspaper, quoting a classified defence intelligence agency report, said that Pakistan detonated the explosive device between September 18 and 21. According to unidentified sources, this test was Pakistan's second as part of its continuing efforts to build an implosion-type nuclear weapon. In addition, intelligence reports indicated that Pakistan had enriched uranium to 93.5 per cent at its atomic plant in Kahuta, the newspaper said.

**Soviet aid:** On the Soviet offer of nuclear plants, Dr Ramanna said the offer was for pressurised water reactors of 440-MW or 1,000-MW capacity.

If India accepted the reactors,

the enriched uranium would have to be made in India or imported. It had also to study how the Soviet reactors fitted into the Indian power programme based on heavy water and natural uranium. Dr Ramanna evaded the question why no final decision had been taken even four years after the Soviet offer.

On the source of heavy water for the Madras atomic plants, he said all the heavy water "came from our own factories." He denied foreign reports that it came from China. Dr Ramanna said the fast breeder test reactor at Kalpakkam would start producing electricity from next year. **Plant safety:** On the safety features of Indian nuclear power stations, he said the containment design was made in such a way that complete containment of radioactivity could be achieved under a severe accident. Moreover, an area within a radius of 1.6 km around the plants was kept under the control of the plant authorities and no civilian habitation was permitted in this zone, he added.

Dr M.R. Srinivasan, chairman of the nuclear power board, who was also present, said a decision on whether or not to decommission the crippled first unit of the Rajasthan Atomic Power Plant would be taken early next year.

## Soviet Offer Discussed

Madras THE HINDU in English 5 Nov 86 p 1

### [Text]

NEW DELHI, Nov. 4.

No decision has yet been taken on the Soviet offer of 1,000 MW pressurised water reactors, Dr. Raja Ramanna, Chairman of the Atomic Energy Commission, told a press conference here today. Accepting the offer would have a lot of technological implications and evaluation studies were being done on all these aspects.

Dr. Ramanna, who addressed the press conference along with five other members of the AEC, said in reply to a question that the Department of Atomic Energy had the needed technologies to enrich uranium and could do so when required. He disclosed that the Bhabha Atomic Research Centre had some ongoing pilot plant level uranium enrichment projects which had proved the Indian capability.

(PTI reports: In a surprise announcement, Dr. Ramanna said India had now the capability to enrich uranium to any level. It could be produced any time the "country required". Asked about the level of enrichment possible in India he said: "This does not matter. It only depends on the number of units added."

(It is the first time that India's progress in enrichment capability has been acknowledged though an experimental centrifuge facility has been in operation for some time at BARC.)

**Conversion of NPB:** The modalities of converting the Nuclear Power Board (NPB) into a corporation were discussed at a meeting of the AEC, and Dr. Ramanna said that one of the objectives of this was to get access to public investments by way of bonds to support the large nuclear programme envisaged in the next 10 to 15 years.

To this end, bonds worth Rs.100-150 crores are likely to be issued in the near future. Asked whether this would suffice, Dr. Ramanna said we would go public again when the need arises. Such a change to a commercial industrial pattern of functioning was essential to implement the nuclear power programme in a faster manner, he said.

'We will create history', he added referring to the big leap of nuclear power generation from the currently installed capacity to the targeted 10,000 MWE by the end of the century.

Speaking about the DAE's performance in the reactor front he said 'all the power plants except RAPP I are under control'. On the restart of the Dhruva research reactor he said that in the last six months the problem had been fully understood and the design of the fuel has been suitably modified. This, he said, has now overcome the problem of vibration and

the reactor is again operational. According to Dr. P. K. Iyengar, Director, BARC, Dhruva's power output is steadily going up.

Studies to rehabilitate RAPP I by new methods are going on, according to Dr M. R. Srinivasan, Chairman, NPB. Both Dr. Srinivasan and Dr. Ramanna confirmed that, as of now, there are no plans to decommission the plant and a more definitive view would be had by the year end.

**Decommissioning no problem:** In case it is decided to decommission the unit, India possessed both decontaminating and decommissioning technology, Dr. Ramanna said. This unit, he said, was based on the Canadian Douglas Point reactor whose experience has demonstrated that decommissioning would not be a severe problem.

Dr. Ramanna replying to a question clarified that the choice of the Narora site was not based on political grounds at all. Dr. Srinivasan said though in the earlier stages some of the members in the site selection committee had expressed concern over Narora being in a seismic zone, DAE experts had evolved a proper design which made the plant safe against seismic activities.

As regards Kaiga, Dr. Srinivasan said there was no environmental hazard because only 20 ha of the forest area would be utilised for the nuclear plant itself apart from the 300 ha of land that will be declared an 'exclusion zone'. The question of environmental hazard, he said, was not relevant at all for the nuclear power plant as the Government had cleared the siting of a hydroelectric power plant in the same area, he said.

**FBTR power generation:** The Fast Breeder Test Reactor (FBTR) will be taken to power generation by the end of this year or early next year, Dr. Srinivasan said. According to Dr. Ramanna, the testing of sodium cooling and fuel performance tests have been completed to satisfaction.

Dr. Ramanna added that the breeding ratio of the carbide fuel had been found to be high and this may bring down the doubling time of the uranium-thorium carbide fuel when the breeder reactors are incorporated into the power programme towards the end of this century or early next century.

In reply to a question about Pakistan's capability about enrichment, Dr. Ramanna said he did not know if all its (centrifuge) units were working. According to him, if all of them were working they would be in a position to produce bomb grade material.

**Pakistan Tests 'Plausible'**

**Calcutta THE TELEGRAPH in English 6 Nov 86 p 1**

**[Text]**

New Delhi, Nov. 5: The atomic energy commission chairman, Dr Raja Ramanna, today said there was reason to believe that Pakistan had tested a nuclear trigger recently. "Testing a nuclear trigger does not produce seismic disturbances. It is plausible that there was an earthquake at about the time Pakistan conducted the test," he told **The Telegraph** when contacted for clarifications regarding India's stand about Pakistan's reported progress in acquiring nuclear capability.

The chairman of the Bhabha Atomic Research Centre, Dr P.K. Iyengar, had said at a press conference yesterday that the dates on which Pakistan tested a nuclear trigger (as reported in the American press) coincided with the date of an earthquake in the same region.

Meanwhile, Pakistan has denied reports in the western press and the Indian media that it tested a nuclear device between September 18 and 21 this year. The Pakistan embassy here said in a release that the report was "totally baseless," and that no such test was carried out. It said the "fact" was "corroborated" by the Barc authorities who had stated that the seismic monitoring records of that period had indicated an earthquake in Pakistan.

/9274  
CSO: 5150/0057

## BRIEFS

REACTOR SHUTDOWN--BOMBAY, November 4: The nuclear research reactor "Dhruva" at the Bhabha Atomic Research Centre has been shut down once again after it was started on October 30. The Atomic Energy Regulatory Board has taken exception to the fact that the BARC authorities did not consult the AERB prior to starting the reactor. The board advised the BARC authorities that before starting the reactor statutory tests should be conducted to prove that the fuel bundles would not fail. Sources at BARC said that the reactor was started only to test the endurance of new fuel bundles which have been designed with minor modifications. The shut down of the reactor was done as originally planned. The authorities claimed that the problem of vibrations which dogged the reactor earlier had come down substantially and it was much below the permissible level. Further, the reactor was being run only at zero power and the safety aspects were not compromised, it was claimed. [Text] [Bombay THE TIMES OF INDIA in English 5 Nov 86 p 5] /12379

BARC FOUNDER'S DAY--BOMBAY, October 30: The Bhabha Atomic Research Centre today celebrated Founder's Day, which marks the 77th birth anniversary of Dr. Homi Bhabha. Speaking on the occasion, the chairman, Atomic Energy Commission, Dr. Raja Ramanna, complimented the staff for successfully overcoming the problems encountered in operating Dhruva reactor. Dhruva's vibration noise level was now lower than that of Cirus reactor, he observed. Dr. Ramanna said Indian nuclear reactors were working "on an average of more than 70 per cent capacity factors." When there were certain troubles these reactors were entirely serviced by Indian engineers and scientists. With the Thal heavy water plant becoming operational, India will have a surplus of heavy water "in due course," he added. The director, BARC, Dr. P. K. Iyengar, said "contrary to what has been appearing in a section of the Press, Dhruva was a well-designed research reactor with enormous possibilities." The problem of vibrations in the fuel elements was solved by redesigning the fuel, he added. [Text] [Bombay THE TIMES OF INDIA in English 31 Oct 86 p 5] /12379

THAL HEAVY WATER PLANT--BOMBAY, Oct. 29: The heavy water plant of the Atomic Energy Commission at Thal in Maharashtra started production at 1-00 p.m. yesterday. The project was launched in February 1982 with a scheduled completion period of five years. Mechanical completion was achieved early this year and was followed by detailed testing and commissioning operations till enrichment started on October 15, when the catalyst was introduced into the first extraction tower. Production of heavy water commenced when enriched gas

was first burnt yesterday. The rated capacity of the plant is 110 tonnes of heavy water per year. The feedstock for the plant is the synthesis gas from the public sector fertilizer plant of 2,700 tonnes of ammonia per day. The technology for the plant was developed by the Department of Atomic Energy based on the operational experience of the Baroda and Tuticorin plants. M/s. Projects and Development India Ltd., a Government of India undertaking was chosen by the Department to carry out detailed engineering. M/s. Rashtriya Chemicals and Fertilizers Ltd. another public sector undertaking which has built and operates the Thal fertilizer plant was entrusted with the construction and operation responsibility of the heavy water plant to ensure integration of the two plants. [Text] [Madras THE HINDU in English 30 Oct 86 p 7]

'DANGEROUS' NUCLEAR PLANTS--Bangalore, 25 Nov--Mrs Helen Caldicott, a nobel peace prize nominee for 1985, and one of the well-known opponents of nuclear power and weaponry, has said Indian nuclear reactors are the most dangerous in the world. Speaking on the hazards of nuclear threat here today, she said most of the workers in these reactors were exposed to abnormally high radiation. Mrs Caldicott alleged that officials of India's nuclear plants were "lying" while claiming that the reactors were safe. She questioned the logic behind India spending a huge amount on nuclear power stations when the same funds could be better utilised. According to her, India had coal reserves for another 200 years which could be safely used for generating thermal power. Further, India had only tapped 10 per cent of its hydro-electric potential. She added that gobar gas could be effectively used in the rural areas. [Text] [Bombay THE TIMES OF INDIA in English 26 Nov 86 p 16] /9274

RAJASTHAN UNIT EXPANSION--Bombay, 20 Nov--The Union Government has given financial sanction for expansion of the existing Rajasthan Atomic Power Station, at an estimated cost of Rs. 712 crores. The expansion programme envisages setting up of two units of 235 MW each. The existing infrastructure at RAPS would enable quicker execution of the project, according to a press release issued by the Department of Atomic Energy here today. The government has also approved advance action for procuring raw materials and ordering critical equipment with long manufacturing time cycle. [Text] [Bombay THE TIMES OF INDIA in English 21 Nov 86 p 6] /9274

NUCLEAR POWER CORPORATION--A Nuclear Power Corporation (NPC) is being set up to improve the efficiency of the nuclear power plants in the country and to mobilise private resources for setting up of future plants outlined in the seventh five year Plan, Minister of State for Science and Technology K. P. Narayanan told the Rajya Sabha on Thursday, reports PTI. Mr Narayanan told Mr Mukhtiar Singh Malik and Mr Mahendra Prasad during question hour that it was envisaged to convert the existing Atomic Power Board into a nuclear Power corporation. He ruled out any foreign collaboration in setting up the proposed plants in view of the high level of indigenous know-how which the Indian scientists and technocrats have achieved. India has achieved technical standardisation and high sophistication for setting up of the nuclear reactors without any foreign collaboration, Mr Narayanan said. Referring to the safety measures for the nuclear plants, the minister said the Prime Minister has set up a committee headed by the union cabinet secretary to device

measures keeping in view any possible disaster. Mr Narayana said government have taken a decision to locate two reactors of 235 mwe at Kaiga in Karnataka and two units of 235 mwe in Rajasthan. Preliminary work in respect of manufacture of long time cycle components for these 4 reactors is in progress.  
[Text] [New Delhi PATRIOT in English 21 Nov 86 p 5] /9274

CSO: 5150/0061

NUCLEAR RESEARCH CENTERS SEEK EXTERNAL FINANCING

TA242105 Jerusalem Domestic Service in Hebrew 1705 GMT 24 Nov 86

[Text] The monthly *Tekhnologot /Technologies* today published a comprehensive investigative article on the subject of the budgetary difficulties being experienced by Israel's nuclear reactors. Meron Tzur gives us the details:

The Nuclear Research Centers in Dimona and Nahal Soreq have in recent years been trying to propose agreements and joint ventures to commercial investors in Israel and abroad in order to put to use the know-how and technology developed at Israel's two nuclear reactors. The reason for this is the budgetary distress which is making the centers' regular activities difficult to carry out. Among other things, the proposals include research and development contracts, and technological advice and assistance services. Thus, for example, the Nuclear Research Center in Dimona is proposing commercial cooperation in the reprocessing [beshihzur hafaqat] of uranium as a by-product [totzar levay] of phosphoric acid. Another area is nuclear electronics. For this purpose, a company by the name of Rotem Industries was established which advertises to investors in Israel and abroad that it is responsible for the commercial application of fruits of the research and development conducted at the Nuclear Research Center. Among other things, the company offers lasers, crystal-growing processes [gidul gevishim], plasma chemistry, nuclear electronic equipment and control systems, and more. However, an industrial plant which was set up in the Negev by the Nuclear

Research Center, in cooperation with the Koor Concern, for the use of nuclear know-how was closed down due to the lack of marketing ability. The Nahal Soreq nuclear reactor also has an industrial company called Yesod that sells nuclear know-how to Israeli and foreign investors.

In an Atomic Energy Commission letter, dated 22 October 1986, Director General David Peleg confirms that external financing, by elements outside the government system, aids in achieving the goals of research rather than harms them. This financing helps maintain vital centers of know-how. Budgetary distress prevents full use of these centers and may also harm their professional level. The commission's director also adds that using the reactors know-how for the state's economy is a motivating factor for the researchers, and general experience has indicated that this does not cause brain drain. We believe, he writes, that balance is maintained between activity which is financed by the state's budget and activity financed by commercial bodies, and there is no fear of pressures by private investors.

An Atomic Energy Commission source this evening confirmed the accuracy of the above data but did not elaborate on the scope of sales of Israeli nuclear know-how to both Israel and foreign elements.

/6091  
CSO: 5100/4510

PAPER DETAILS NUCLEAR BOMB EFFORTS

Bombay THE TIMES OF INDIA in English 6 Nov 86 pp 1, 9

[Article by Bharat Bhushan]

[Text]

PAKISTAN's attempts at making a nuclear bomb have involved many subterfuges and illegalities both on its part as well as on the part of the nuclear technology exporting countries.

As a result of these activities, it has now developed both complex engineering capabilities to produce weapons-grade nuclear material for the core of the bomb and the ability to assemble and test the non-nuclear components of the weapon.

Although the plutonium route (the one used in the Nagasaki bomb and the Pokharan test) is the easier one to making a nuclear bomb, Pakistan has apparently mastered the relatively difficult enriched uranium route (the one used for the Hiroshima bomb).

Both pure plutonium and enriched uranium do not occur in nature and require complex engineering feats to produce. Pakistan's initial attempt was to produce pure plutonium from the spent fuel of its heavy water/natural uranium reactor Karachi. To this end, in 1973 it sought reprocessing technology for a plant to be set up at Chashma from SGN of France. This deal was controversial from the beginning and was finally scrapped under U.S. pressure in 1979. But much before this, Pakistan had begun work on the enriched uranium route.

For making weapons-grade of enriched uranium the concentration of uranium-235 molecules in the naturally occurring uranium-238 is to be upgraded from the low 0.711 per cent

to more than 90 per cent of the former. Of the various methods of enriching uranium the two major ones are laser and ultracentrifuge enrichment. Pakistan sought to opt for the latter technology which physically separates U-235 from U-238 molecules by spinning uranium hexafluoride gas at incredibly high speeds in a centrifuge.

The history of covert purchasing activities of Pakistan to acquire ultracentrifuge technology has been fairly well documented. It not only points to the lacunae in the export laws governing nuclear technologies but also to how existing laws can easily be bypassed. It also shows up Pakistan as

a master manipulator in the nuclear blackmarket and its ability to stay a step ahead of the law.

In its pursuit of enriched uranium, by 1979 Pakistan had acquired as much as 100 tonnes of unsafeguarded uranium oxide concentrate, or "yellowcake" from Libya which the latter had purchased from Niger.

Simultaneously, it started acquiring the technology for the two further crucial stages required for enrichment, i.e., purifying "yellowcake" and converting it to uranium hexafluoride and an enrichment plant for enriching uranium hexa flouride gas to U-235.

The equipment for the first was smuggled to Pakisan between November 1976 and March 1977 by a West German, Albrecht Migule, head of an engineering firm called CES Kalthoff GmbH. He purchased the equipment from a number of West German firms, transported it in 62 truckleads to Pakistan and persuaded his West German associates to help assemble the uranium hexaflouride plant at Dera Ghazi Khan.

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Backgrounder

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Simultaneously, Pakistan had begun, under a secret initiative called project 706, the setting up of ultra-centrifuges to convert uranium hexafluoride from its Dera Ghazi Khan plant to enriched uranium at Sihala and Kahuta near Islamabad. Sihala was to be an experimental facility with a small ultracentrifuge while it was planned to instal 2,000 to 3,000 centrifuges at Kahuta.

At the centre of the purchases was an audacious German-trained Pakistani metallurgist, Dr. Abdul Qadir Khan. Dr. Khan worked in The Netherlands between 1972-75 for FDO, a subcontractor of URENCO, the British-Dutch-West German uranium consortium. From mid-1974 onwards he is believed to have passed on URENCO's classified enrichment know-how to Pakistan. By mid-1975, he had been banned by the Dutch authorities from further enrichment related work. Subsequently, he fled to Pakistan and was made in-charge of the centrifuge enrichment programme.

From Pakistan itself, Dr. Khan twice sought enrichment related know-how from his erstwhile colleagues at FDO. These requests were refused and later became the basis for trying him for espionage.

FDO, however, indulged in an illegal sale to Pakistan in 1977 of specially-designed, computerised measuring machinery originally meant for URENCO's enrichment plant after URENCO had backed out of the sale. The equipment was sold to Pakistan instead despite its being on the Dutch export-control list.

Around the same time, another Dutch company Van Doorn Transmissie, partly owned by the Dutch government, supplied 6,500 specially-hardened steel tubes to Pakistan. These serve as the actual centrifuges — tall spinning drums in which uranium hexafluoride gas is swirled at high speed to separate U-235. The tubes were applied despite several oral and written warnings from the government not to do so.

#### KAHUTA BASES

During the late 1970s and early 1980s, Henk Selbos, one of Dr. Khan's Dutch purchasing agents, supplied Pakistan with various aluminium components and 10,000 specially-hardened steel balls which could be used for the bases of the Kahuta centrifuge. Dutch authorities warned him but once again pleaded helplessness beyond that as the items were not on their export-control list.

They were finally able to get Selbos in late 1983 when he tried to smuggle a U.S.-made high-speed oscilloscope to

Pakistan. Selbos had mislabelled the oscilloscope, which was on the banned list, but was caught quite accidentally because Dutch customs agents at that time were opening each and every export consignment as a part of a "work to rule" agitation!

Pakistan's covert purchasing activities also spanned Switzerland. From Vakuum Apparat Technik of Haag, high vacuum valves were purchased for the enrichment plant. They were not considered "nuclear sensitive" by the London club of nuclear exporting countries and were thus sold legally.

Similarly, from another Swiss firm, CORA Engineering, Pakistan bought a sophisticated gassification and solidification unit which feeds uranium hexafluoride gas into the centrifuges and then transforms it back into a solid at the end of the centrifuge process. For this not even an export licence was required. Yet, both CORA and officials in Berne are believed to have known that Pakistan needed this unit to enrich uranium.

In West Germany, Leybold Heraeus of Hanan sold to Pakistan vacuum pumps and equipment for gas purification used in uranium enrichment in 1977. These, too, required no export licence. Similarly, Aluminium Walzwerke of Singen, which supplied rolled aluminium rods and about 10,000 aluminium parts specially welded according to plans supplied by Pakistan, had no problems in exporting them as they were not on the banned list.

#### SALE FORBIDDEN

Attempts were made in 1977 to purchase bellows for the ultra-centrifuge from France. The demand was for 10,000 bellows but the French customs forbade the sale. A part of the order, it is believed, was then sent through a firm in Belgium along with dies to enable Pakistan to make the rest indigenously.

In the same year, two orders for high frequency invertors for controlling the speed of the fast-spinning centrifuges, ostensibly "textile centrifuges" in this

case, were placed with the British subsidiary of the U.S. firm, Emerson Electric. The first order of 30 invertors was despatched to the Pakistani army's special works organisation in charge of construction and purchases at Kahuta in August, 1978, through Weargate Ltd, a front company set up in Britain.

The second order of 60 invertors was placed through Weargate had Team Industries of Leonberg, West Germany. It could not be fulfilled as by this time high frequency invertors had been added to the export control list.

charges called "lenses", special steel plates for the non-nuclear triggers of the nuclear weapons, hollow steel spheres for the internal support structure of the bomb and flash X-ray machines for verifying the effectiveness of nuclear-weapons triggering packages.

Meanwhile, a separate attempt was made to buy invertor parts and sub-assemblies from Britain. To keep up with the Pakistanis, Britain had to expand its export regulations twice in 1979 to ban the export of these components.

Its attempts at buying invertors having failed in Britain, Pakistan shifted its efforts to Canada. In 1980, Canadian customs arrested Abdul Aziz Khan and his two accomplices at Montreal airport attempting to export 19 boxes of invertor components purchased from U.S. and Canadian companies marked "condensors and resistors". It was the tenth of a series of shipments, nine having eluded the Canadian customs.

#### ELECTRONIC SWITCHES

By mid-1984, qualitative shifts had occurred in the nuclear-equipment purchasing efforts of Pakistan, when it started seeking components used in nuclear weapons themselves. The emphasis now was clearly on making the bomb itself.

The components sought included high speed electronic switches (krytrons) used as nuclear-weapon triggers; precision-shaped high-explosive

In an attempt to smuggle 50 KN-22 krytrons, a Pakistani, Nazir Ahmed Vaid, was arrested along with two others by U.S. customs officials in June 1984. General Zia claimed that they were switches for revolving lights atop "ambulances"! According to an ABC report of July 11, 1985, Pakistan used a U.S.-made krytron to detonate a non-nuclear triggering package for a nuclear weapon.

A number of companies and individuals from Europe and America involved in the illegal sale of nuclear equipment have been tried between mid-1984 and mid-1985. But what is surprising is that there is a big gap between the crimes and the punishment — the total time likely to be served by the defendants in all these cases is unlikely to be more than 15 months and total fines levied would come to about \$ 16,000. By contrast, the deal to supply the uranium hexaflouride plant by Albrecht Migule alone involved \$ six million. Dr. Abdul Qadir Khan himself has been acquitted by the Dutch supreme court.

In the meantime, Pakistan has successfully set up nearly 1,000 ultracentrifuges at Kahuta, used them to enrich uranium to 93.5 per cent and tested two nuclear devices. None of the aggrieved countries have as yet made any attempt to stop Pakistan from using the equipment obtained illegally from them or even condemned its use in any international forum.

/12379

CSO: 5150/0055

WRITER DETAILS EVIDENCE ON NUCLEAR CAPABILITY

New Delhi PATRIOT in English 10 Nov 86 p 4

[Article by V.D. Chopra]

[Text]

Reliance on nuclear weapons has been central to imperialist power politics. The United States and the NATO military-political alliances have always planned to impose their diktat on others through attaining military-strategic superiority. Their ultimate goal being world domination.

This adventurous military course has now acquired an ominous new dimension. In the wake of the Strategic Defence Initiative (SDI) announced by the US President in March 1983, the creation in Asia and the Pacific of NATO-type military-political alliances, nuclearisation of Diego Garcia, setting up of the Rapid Deployment Force, Pakistan has begun to implement its nuclear weapons project, code-named 'Project 706'.

There is enough direct and indirect evidence leading to the conclusion that Pakistan has not only achieved capability to produce nuclear bombs but has perhaps already produced one.

According to reports in the Western mass media:

(a) Pakistan has developed the capability to produce a nuclear bomb at least at three major centres—Kahuta, Sihala and a top secret laboratory called 'New Labs'.

(b) the construction of a plant to produce nuclear weapons material has almost been completed in Chashma. When the plant is ready, Pakistan will be able to assemble

20 to 40 nuclear devices annually.

(c) the Zia regime has finalised arrangements for the eventual acquisition of a nuclear weapons delivery system. A wide-ranging agreement with the West German missile firm ORTAG has been signed, under which the Pakistani army will get a large batch of intermediate-range missiles. A factory in Pakistan has been set up to put together the missiles from components made in West Germany by ORTAG. Later, Pakistan will itself indigenously manufacture the missiles components. Its long-term plan is to develop a missile delivery system based on intermediate-missiles now being supplied by ORTAG. The delivery system could carry missiles with nuclear or conventional warheads.

(d) Pakistan's Kahuta project for building an uranium enrichment facility based on gas centrifuge method has made further headway. A major bottleneck has been removed through the successful import of 30 inverters from Britain, which had earlier decided to block all material going into creating a nuclear capability in Pakistan. These inverters are a crucial component in the gas centrifuge system for uranium enrichment.

(e) under a secret agreement, Pakistan has provided facilities to American electronic intelligence services, are manned by US technicians, for 'intelligence gathering'.

These facilities are already available in five cities of Pakistan to 'probe' the territories of India, the Soviet Union and the Gulf countries.

Another major development has taken place following US Defence Secretary Casper Weinberger's visit to Pakistan in

the third week of October 1986. The Pentagon has agreed to 'react favourably' to President Ziaul Haq's request for occasional patrolling by West Asia-based Advanced Warning and Control System (AWACS). The AWACS would be lent pending the development of such capability within Pakistan by the early sale of radar planes, probably the Hawkeye instead of the more expensive but more formidable Boeing AWACS.

How will the AWACS, manned by US personnel, fly over Pakistani airspace with no landing and refuelling facilities? The inference is that the US has already set up

air bases in Pakistan.

A section of the Pak Press is already asking: "Will the Pakistani government be able to retain strict security and control over US-manned AWACS flights over its airspace, or has it already given up the sovereignty of its airspace to the Americans?" (Daily Muslim, 18 October, 1986)

All these developments underscore the point that there is an inbuilt system in the decision-making process of the major western countries whereby Pakistan can circumvent the statutory and administrative curbs on export of strategic material and industrial components going into nuclear build-up. This can be possible only if Washington in particular allows room for manipulation in the case of specific purchases by Pakistan. The US has given Pakistan the status of a "frontline" state, to enable it to make nuclear bombs.

There is evidence also to show that the implementation of 'Project 706' has made a vigorous beginning.

A Pakistani expert on defence, A Fareed Ameen, has said that "the warheads must be known to work and packed in a deliverable form. A delivery system capable of transporting these warheads and striking at the specified targets

must exist. Finally, though certainly not last, a command and control system for a Small Nuclear Force (SNF) is also a necessary feature". Pakistan obviously has developed a delivery system as indicated above.

Fareed Ameen has further said: "The quality of fissile material needed for the core of a fission bomb is usually called critical mass. This is the minimum amount of the material needed for a nuclear chain reaction to begin. The weight and size of this 'critical mass' is dependent on the actual bomb design. However, for sophisticated bomb designs this can be as low as four kg of relatively pure Pu-239 and 11 kg of HEU. Commonly accepted figures on the other hand are five kg of Pu-239 and 15-20 kg of HEU.

**"It is generally believed that Pakistan has attempted to take both these routes to its nuclear bomb."**

Of the two methods, enrichment is more difficult, requiring greater technical sophistication. Pakistan currently has two gas centrifuge enrichments in operation. One is an experimental scale plant in Sihala. It is rumoured that its current capability is 2000-3000 centrifuges. Also, the Kahuta facility is thought to have achieved partial start-up some time in 1984. If the Kahuta facility were to become fully operational, its 1000 centrifuges would be enough to produce about 15 kg of HEU, or about one bomb a year.

"In the 1970s, Pakistan began negotiations with France over the sale of a reprocessing plant which was to be based at Chashma. This plant has the capacity to reprocess 100 kg to 200 kg of plutonium per year, enough for about 20-40 bombs. Presumably, Pakistan planned to divert plutonium from KANUPP, a civilian nuclear power reactor which is fully under the International Atomic Energy Agency (IAEA) safeguards."

Fareed Ameen further said that after Pakistan secured the blueprints for the reprocessing plant, it purchased in the 'international grey market' certain key components which were used to construct a small facility at Rawalpindi. This reprocessing plant, called the New Labs, is capable of extracting 10-20 kg of plutonium a year, good for two or four bombs. New Labs underwent cold tests as far back as 1982.

SAUDI ARABIA

NUCLEAR POWER IN GULF COUNTRIES DISCUSSED

London AL-TADAMUN in Arabic No 187, 8-14 Nov 86, pp 60-61

[Article by Judith Pereira: "Kuwait Was First To Think of Nuclear Power and Saudi Arabia Has Helped Others Obtain It"]

[Text] Kuwait was the first Arab Gulf country to think of using nuclear power to generate electric current.

In 1977, an advanced and long-term plan was designed for this purpose, since the current nuclear goal was to construct a reactor for experimental purposes with a capacity of between 40 and 50 megawatts for the production of electric power and the desalination of seawater.

At the end of the 1980's, Kuwait planned to construct a nuclear plant with a capacity of 600 megawatts for the desalination of seawater, to be followed by another plant in the beginning of the 1990's. It is expected that the total capacity of the nuclear plants will reach about 3,600 megawatts in the year 2000 in addition to purifying 150 million gallons of fresh water a day.

However, the plans that the international companies presented for the construction of the first experimental reactor were so expensive that Kuwait decided to freeze its plans and began to concentrate instead on solar energy. After subjecting this matter to more scrutiny and study, it became clear that a small country like Kuwait, whose population does not exceed 1,000,000 and which only has a small amount of industry with a limited network to deliver electricity, is not completely suitable for the exploitation of nuclear energy, unless small enough units with appropriate quantities and relatively inexpensive prices are provided.

However, new interest in this matter has emerged in the framework of the Gulf Cooperation Council. If the small Gulf countries that are members in this council could merge and unify their electricity networks, then nuclear energy would become a profitable proposition and its application completely possible.

For its part, Saudi Arabia is in the process of constructing a center for nuclear research in Jidda University with the cooperation of the British Nuclear Energy Agency, which will act as a consultant. Other plans are being

studied to establish a nuclear reactor for research with a capacity of 5 megawatts near the Oil and Metal Resources University in Dhahran with the cooperation of France. Saudi Arabia is currently studying the possibility of constructing several small nuclear power plants, but practical plans have not yet been designed for this, nor have any practical measures been taken in this regard.

It appears that Saudi Arabia has studied the question of financing nuclear programs in other countries, especially in Bangladesh and Taiwan, but it denied any connection with the nuclear program in Pakistan, despite the strong ties between the two countries.

The United Arab Emirates mentioned that it was interested in constructing a nuclear reactor within the framework of the Gulf cooperation Council. For this purpose, in 1980 it employed a consultant from the International Nuclear Energy Agency to do a field study.

It is clear that if nuclear energy is to succeed in the Gulf region, regional cooperation is extremely important. This was principal topic of the first Arab conference on nuclear energy, which was held in Baghdad in June 1980.

Many Arab scientists believe that if the Arab world fails to make any progress in this field, it can be attributed first and foremost to the failure of the Arab countries to cooperate among themselves. This is based on the report that 'Adnan Mustafa presented to the conference that the Uranium Institute in London held in 1981 and that included the following:

"At the time that the principal state of development in the Arab world is approaching its end, serious faults and inadequacies have been discovered, similar to those less complicated ones that customarily appear in the industrialized countries. The first difficult lesson extracted from this first period, which has been characterized by progress, is the failure to make any progress in establishing the bases of a nuclear industry within the borders of the Arab world. This has led in turn to its falling behind in joining the nuclear procession by at least 2 decades."

As for the conclusions at which the first nuclear energy conference arrived, they were extremely clear and are the following:

There is an urgent need to intensify cooperation among the Arab countries in planning to obtain nuclear energy and to ensure sources for fueling it by means of a united Arab authority to handle nuclear fueling.

The establishment of a unified electrical network linking the eastern and western Arab countries, which will lead to appropriate and reliable exploitation of traditional sources of energy and which will also facilitate the first assembling of nuclear power plants for commercial purposes, is a condition for extending this network as quickly as possible.

There is a second pressing need for the industrialized world to cooperate completely with the Arab world in the area of nuclear technology transfer. The best step the industrialized countries of the "North" can take to preserve

organic fuel for future generations in order to use it properly is to help the countries of the "South" obtain nuclear technology for peaceful purposes.

It appears that there is an increasing realization now that the gains that result from any cooperation in this area would be guaranteed to put an end to existing political differences among the Arab countries and to any spirit of independence present among them with regard to nuclear programs.

It seems that the first indication that came from the West and that showed a willingness on the part of the advanced industrialized countries to help the Arab world came from Canada and France. It appears that the contradiction existing between the desire for non-proliferation of nuclear weapons and the desire to sell nuclear reactors will continue, so that it is believed that it will become more serious in coming years. This will give purchasers a great advantage, especially those that possess the necessary funds, such as the states of the Arab Gulf. True cooperation and political coordination among the Arab countries could lead in the end to a rapid transfer and flow of nuclear technology to the countries of the Middle East, if this were desired. However, it will remain open to debate as to whether nuclear energy is the best way economically, ecologically, and with regard to peace to generate electrical current, in both the long and the short run.

13292/9312  
CSO: 5100/4509

PAPER URGES RECONSIDERATION OF NUCLEAR RESEARCH PROJECTS

Kaduna NEW NIGERIAN in English 11 Oct 86 p 1

[Editorial: "Nuclear Threat"]

[Text]

THE bursting into flames of a Russian nuclear powered submarine armed with 16 intercontinental ballistic missiles is the latest reminder that with the invention of nuclear power man may have saddled himself with a Frankenstein gone out of control. Even now that it rests on the sea bed imagining the consequences of the missiles going off is still hair-raising.

Coming barely six months after the Chernobyl nuclear accident this new nuclear mishap may give credence to the claim that the Russians are particularly prone to nuclear accident because of their laxity in enforcing safety regulations. But as leakages of nuclear fumes at the Three Mile Island, and the Nevada Desert — all in the US showed, accidents do not respect national boundaries. It is a global threat.

The latest incident therefore is a forceful reminder of the need to stop the proliferation of

nuclear power. To this end, it could not have come at a more auspicious time than on the eve of a summit between the Americans and the Russians. As they deliberate in Iceland we hope President Ronald Reagan and Mr. Gorbachev would find it instructive enough and reach a pact to limit its production. Being the only two nations with a large nuclear arsenal they owe it to humanity. Their example may serve to convince other countries of the danger it poses to mankind.

Back home the lesson this incident teaches is to urge a reconsideration of our nuclear research programme going on at the University of Ife and Ahmadu Bello University. Some weeks ago the Minister of Science and Technology, Professor Sylvester Emovon revealed that Nigeria has made considerable stride in her attempt to acquire the nu-

clear know-how. While we join in the chest-beating for our arrival at the nuclear club, we should consider the reverse of the nuclear coin. With our abysmal management and maintenance record it is with trepidation that we imagine the scenario of a relatively mild accident of a nuclear leak!

To forestall such an eventuality, we suggest that the project be fitted with adequate safety mechanisms that will include an early warning system.

SOUTH AFRICA

ESCOM PLANS NUCLEAR ENERGY STATION IN SOUTHERN CAPE

MB241622 Johannesburg SAPA in English 1609 GMT 24 Nov 86

[Text] Cape Town, 24 Nov (SAPA)--A special team of investigators will soon start examining a stretch of coastline in the southern cape between Gansbaai and Agulhas as part of an ESCOM [Electricity Supply Commission] program to identify possible sites for future nuclear energy stations.

In a study which started in 1982, a total of 19 "candidate" areas have been identified along the coast from Natal to the western cape. Mr Otto Graupner, project leader of the program, said at a press conference today that the result of an investigation into a possible site on or near the coast of Natal would probably be made known early next year.

Preliminary investigations had been completed in areas to the east and west of Port Elizabeth, Mr Graupner said.

A statement released by ESCOM today said a detailed examination of the stretch of coastline between Gansbaai and Agulhas would start "during the coming months."

It was stressed that no decision had been taken to build a second nuclear power station. The studies being undertaken were purely part of a national program to identify possible sites since it was clear that at some stage more nuclear stations would have to be built.

"It is prudent that viable sites should be identified and secured as soon as possible so that both government and local planning authorities can take them into account and avoid conflict over land use.

"ESCOM is extremely conscious of the concerns of the public about nuclear power stations and is committed to keeping all concerned parties informed about the progress of the investigations," the statement said.

After completing its investigation of the Gansbaai-Agulhas area, the team will move its attention to a large stretch of coastline on the cape's west coast.

/9738  
CSO: 5100/10

NUCLEAR ACCIDENT EMERGENCY MEASURES REHEARSAL

Cape Town CAPE TIMES in English 16 Oct 86 p 1

[Article by Chris Erasmus]

**[Text]** THE City Council will hold real-life rehearsals of emergency measures to be taken by Capetonians in the event of a serious accident at Koeberg nuclear power station.

The rehearsals, to be held over the next few months in different parts of the city, will be designed to fully inform the public of what to do, and why, during a nuclear emergency. Evacuation instructions will be given from helicopters and police vehicles.

The city's Medical Officer of Health, Dr Reg Coogan, announced the plan yesterday at the annual Atomic Energy Corporation's licensing exercise for Koeberg.

Dr Coogan said he was very pleased with this year's scenario, as created by the AEC, to test the emergency plan prepared to deal with an accidental release of radioactive materials from Koeberg.

"This year the AEC made the radioactive 'plume' from the simulated accident drift over the city centre for the first time, creating a credible scenario.

io. I have been trying to get them to do this for eight years.

"This had demonstrated that no matter what emergency plans we make, they will only work if every member of the public is aware of what is going on, what they must do during an emergency and why.

"The City Council plans to carry out at least four rehearsals in the next few months in different parts of the city with the object of explaining as fully as possible what the emergency plan is all about," he said.

The rehearsals will be carried out with the minimum of dislocation to normal life but with a maximum of publicity. People will not actually be required to take shelter in their homes or offices, for instance, or to actually evacuate the city centre.

Yesterday's simulated emergency began with a 15-minute "release" of radioactive material as a result of a malfunctioning valve at Koeberg. A radioactive cloud then drifted over the city, requiring simulated evacuations up to 16km from the plant and indoor sheltering up to a distance of 40km.

/12828  
CSO: 5100/14

SOUTH AFRICA

TOWNS OBJECT TO NUCLEAR STATION

Cape Town CAPE TIMES in English 28 Nov 86 p 10

"Should South Africa be embarking on an extension of its nuclear power programme at a time when, for the most part, the rest of the world is either suspending the construction of further nuclear power stations or severely curtailing such plans?" asks a second editorial on the the same page. "Now the Southern Cape coastline seems to be the favoured area for ESCOM's[Electricity Supply Commission] next nuclear power station. Its announcement of an investigation of 19 possible sites coincided with the first official removal of radio-active waste from Koeberg, which will automatically double the risk of a major nuclear accident." The paper says that "already some coastal towns, notably Hermanus, have objected to having the nuclear power station within proximity of their municipal boundaries. We would urge ESCOM not to ride rough-shod over local feeling and force the power station on a local authority which does not want it."

/9274  
CSO. 5100/11

SOUTH AFRICA

MAN WHO GAVE NUCLEAR 'SECRETS' TO ANC RELEASED

MB021216 Johannesburg SAPA in English 1140 GMT 2 Dec 86

[Text] Pretoria, Dec 2, SAPA — Dr Renfrew Christie was released from Pretoria prison on Sunday, after serving six of the 10 years to which he had been sentenced for handing over nuclear secrets to the ANC. A Supreme Court application was still pending at the time of his release that he be released on the grounds of the offer by the state president, Mr P.W. Botha, that Nelson Mandela and other political prisoners who renounced violence would be released. It could not be established in Pretoria today on what grounds Dr Christie, 36, had been freed.

Dr Christie, a former Cape Town University researcher, told a Johannesburg newspaper that he would like to see the ANC legalised. "I do think Botha is wrong when he says the ANC lacks majority support. But that cannot be tested while it is underground." Dr Christie was reported to be at his mother's house in Johannesburg, where he is still considering his future.

/9274  
CSO: 5100/11

SOUTH AFRICA

ZIMBABWE MINISTER DEMANDS INSPECTION OF RSA REACTOR

MB030954 Johannesburg SAPA in English 1304 GMT 2 Nov 86

[Text] Harare, Nov 2, SAPA--South Africa's nuclear reactor posed a danger to the region in case of an accident and should be inspected by the International Atomic Energy Agency (IAEA), a Zimbabwean cabinet minister said today.

In an interview with the semi-official news agency, ZIANA, the minister of energy, water resources and development, Mr Kumbirai Kangai, said the existence of a nuclear reactor, the position, maintenance and condition of which were internationally unknown, was a "source of grave concern" to Zimbabwe.

At an IAEA meeting in Vienna, Austria, where delegations and experts from all over the world met to discuss the Soviet Union nuclear disaster at Chernobyl in April Zimbabwe sponsored a recommendation that South Africa's plant be inspected.

The recommendation would be submitted to the IAEA's board of governors who were expected to give South Africa a directive to allow independent experts to inspect the nuclear reactor in line with international practice, he said.

Mr Kangai, who represented Zimbabwe at the Vienna said:

"Several attempts were made by the director general of the agency in the past to have the Pretoria reactor inspected, but South Africa has not been cooperative at all. It has always put impossible conditions.

"This is a matter of grave concern to Zimbabwe because we will all be engulfed in an unknown disaster should an accident happen at this reactor."

Zimbabwe ratified two conventions while attending the meeting. These covered early notification of nuclear disasters and the need to invite other international experts in times of nuclear danger.

Although the country did not have nuclear reactors, it used radio-active materials in the army, government, hospitals and other areas, he said.

"Almost all the countries represented at this meeting agreed to ratify the conventions. South Africa, though a member of the IAEA, did not attend the Vienna meeting," he said.

Zimbabwe also made it clear that it supported the use of nuclear power for peace and development only, a position supported by many countries.

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CSO: 5100/7

SOUTH AFRICA

SAFE RADIOACTIVE WASTE TRANSPORT PROMISED

MB240824 Johannesburg SAPA in English 0803 GMT 24 Nov 86

[Text] Cape Town, Nov 24, SAPA — The mere mention of the words radio-active waste, or radwaste as it is generally called, normally creates a reaction of fear and mistrust, the minister of mineral and energy affairs, Mr Danie Steyn, said at the Koeberg nuclear plant outside Cape Town today. Addressing a news conference before the first transportation of low level radio-active waste from Koeberg to Vaalputs, where the waste will be stored, Mr Steyn said he wanted to assure the people of South Africa that the transportation of radwaste complied with the licence granted by the Atomic Energy Corporation and though fear and mistrust was understandable, it was unfounded. "Today I want to assure you again of the high standards which apply for the safety, not only of the general public, but also for those working at Koeberg," Mr Steyn said.

It is expected that Koeberg would produce 1000 steel and 500 concrete holders of low and middle level radwaste per annum. The holders will be transported to Vaalputs in Namaqualand where it will be buried in 10 metre deep ditches. According to the licence granted the vehicle must have two drivers and there will be radio communication between the vehicle and Koeberg along the entire route and the minimum specified time of communication is once every hour.

Professor John Martin, chairman of the Council for Nuclear Safety, said the council had, after careful review of all safety aspects, recommended to the Atomic Energy Corporation that authority be granted which will allow the Vaalputs facility to receive low and intermediate radioactive waste. "All radioactive waste, which includes the protective clothing, such as overalls and gloves, will be packed and buried in steel drums. The concentrates, liquid waste, ion-exchange resins and filters will be mixed with cement and packed into concrete containers," he said.

The distance between Koeberg and Vaalputs is approximately 520 kilometres and the first load comprise four concrete drums and 16 metal drums. The travelling time is expected to be about nine hours.

/9274  
CSO: 5100/9

SOUTH AFRICA

NUCLEAR WASTE REACHES DESTINATION SAFELY

MB281449 Johannesburg SAPA in English 1415 GMT 28 Nov 86

[Text] Cape Town Nov 28 SAPA — The third load of nuclear waste from the Koeberg plant arrived at Vaalputs today after a second truck was despatched from Cape Town yesterday after a small crack was discovered in the chassis of the trailer carrying the load of four concrete drums of intermediate level waste and 16 steel drums of low level waste.

Mr Andre van Heerden, Western Cape public relations manager of ESCOM [Electricity Supply Commission] said today the small crack in the chassis was discovered during a routine inspection when the trailer pulled off the road at Klawer. Rather than continue the driver acted in accordance with the laid down procedure and a second trailer was despatched. The load was split in two and the second trailer made two trips to Vaalputs to deposit the load. Both trailers will return to Cape Town today.

/9274  
CSO, 5100/11

SOUTH AFRICA

BRIEFS

ALLEGED NUCLEAR BOMB CAPABILITY DENIED--From next year South Africa will be able to manufacture between 40 and 100 atom bombs a year, claims a leading British science magazine. The New Scientist quotes United Nations sources as saying that even the small pilot plant for enriching uranium at Valindaba, near Hartbeensport Dam, can produce enough plutonium--a man-made element used to explode the atom bomb on Nagasaki--for up to 25 nuclear bombs. Apart from this the pilot plant could turn out enough enriched uranium to build two or three bombs. Commenting in Pretoria, Dr Wynand de Villiers, executive chairman of the Atomic Energy Corporation, said it was nonsense to suggest South Africa could manufacture plutonium from the Valindaba uranium enrichment plant. "As anybody knows, plutonium is a by-product of nuclear reactors of which we have three, two at Koeberg and one at Pelindaba. These three are all subject to regular international inspections under the original guarantees." He would not comment on the manufacture of nuclear bombs "because that is pure speculation." [Text][Johannesburg THE STAR in English 8 Oct 86 p 9]/12828

NUCLEAR PLANT OPENS IN CAPE TOWN--South Africa can expect more nuclear power stations in the future. The chairman of ESCOM [Electricity Supply Commission] says other sources than coal have to be looked at for the generation of power and uranium he says is more efficient. The Koberg nuclear power station near Cape Town was inaugurated last night and, while speaking at the ceremony, the ESCOM chairman gave no indication where or when new nuclear stations will be built. South Africa has been threatened with expulsion from the International Atomic Energy Agency for refusing to allow inspection of its nuclear facilities. [Text] [Umtata Capital Radio in English 1200 GMT 14 Nov 86 MB] /9274

CSO: 5100/8

USSR

TASS: IAEA'S BLIX SPEAKS ON CHERNOBYL AT UN

LD112101 Moscow TASS in English 1821 GMT 11 Nov 86

[Text] New York, November 11 (TASS)--Hans Blix, director general of the International Atomic Energy Agency, speaking today at the United Nations General Assembly, said that the accident in the number 4 power reactor at Chernobyl prompted comprehensive Soviet measures to stop radioactive releases, to give medical care and to protect and decontaminate the environment. The destroyed reactor is now encased and two undamaged units are again, after some technical modifications, in operation. Other countries in Europe took a variety of protective measures and a series of actions was initiated at the IAEA, he said.

Following an extensive briefing we discussed with the Soviet authorities the actions which could be taken within the IAEA to enable all to learn from the accident and to consider the national and international nuclear safety measures which should be adopted.

Among these actions was the convocation in July and August of a governmental expert group at IAEA headquarters to draft two international conventions on early notification of a nuclear accident and on assistance in the case of a nuclear accident or radiological emergency. Two consensus texts emerged from the four-week meeting and were adopted at a special session of the general conference in September. The convention on early notification has, in fact, entered into force on 27 October 1986. Under this convention, the parties undertake to report immediately any nuclear accident which may result in a transboundary release of radiological safety significance.

In the spirit of the convention, the Soviet Union immediately notified the IAEA about the recent accident of its nuclear submarine in the Atlantic. Under the convention on assistance, the parties undertake to facilitate prompt assistance in the event of a nuclear accident or radiological emergency in order to minimize the consequences and to protect life, property and the environment.

Another action was a post-accident review meeting in Vienna in August with over 500 nuclear experts from all over the world participating. A comprehensive and frank report was presented by Soviet experts and was discussed in a detailed and open manner.

Against the backdrop of an extensive media reporting which was not always accurate, it was of great value that this remarkable international expert analysis was able not only to explain the causes of the accident, but also to reach more precise conclusions concerning the real dimensions of the accident. Some thirty persons have died of radiation--not several thousand as was widely reported. The health effects of the radiation which spread to other European countries appear not to be significant. A consensus report summarizing the results of the expert meeting and adding recommendation for actions and programmes to strengthen nuclear safety was prepared by an International Group of Eminent Nuclear Safety Experts (Insag). As a result of that report, *inter alia*, a considerably expanded nuclear safety programme for the agency is to be considered by the board of governors next, and will commence in 1987.

The special session of the IAEA general conference to which I referred earlier was convened in September with the sole purpose of considering measures to strengthen international cooperation in nuclear safety and radiological protection. The consensus reached by the conference on certain basis policy questions was significant.

I would like to conclude by recalling some of the lessons that we have learned this year and which we might do well to remember as we look to the future, he said. In the computer, space and nuclear age, cooperation among nations is an absolute necessity to reduce the risks of our modern technologies.

Above all cooperation is required to avert the threat of the use of nuclear weapons. The international community must redouble its efforts to ensure non-proliferation, to cease the nuclear arms race and to work towards disarmament. The remarkable international solidarity and cooperation which we have witnessed in the wake of the Chernobyl accident is an example of how the world can draw together to try to ensure that technology will be used safely for the benefit of humankind, Hans Blix stressed.

/8309  
CSO: 5100/10

USSR

ACADEMICIAN VELIKHOV ON ROME NUCLEAR POWER SEMINAR

PM111637 Moscow IZVESTIYA in Russian 11 Nov 86 Morning Edition p 5

[Own correspondent V. Pershin interview in Rome under the rubric "IZVESTIYA Interview" with Academician Ye.P. Velikhov, vice president of the USSR Academy of Sciences: "The Atom and Nature"--date unspecified, first paragraph is editorial introduction]

[Text] On the initiative of the international "Science for Peace" committee and in conjunction with the Italian Foreign Ministry a seminar entitled "World Cooperation for the Peaceful and Safe Use of Nuclear Power" has been held in Rome. Leading scientists from the Soviet Union, the United States, Italy, the FRG, China, and a number of other countries took part in its work. V. Pershin, IZVESTIYA's Rome correspondent, asked Ye.P. Velikhov, head of the Soviet delegation and vice president of the USSR Academy of Sciences, to comment on the results of the seminar.

[Velikhov] The seminar's aim was to examine certain important questions of organizing widespread international cooperation in the sphere of the use of nuclear power, including the sphere of ensuring the safe working of nuclear power stations and the development of new nuclear reactor designs. The problem of the influence on the environment of the various ways of generating power was also discussed.

Until recently cooperation in the sphere of planning nuclear reactors was not active enough. This was primarily because in the West reactors are built by private firms guided first and foremost by their own interests. However, after the accidents at the Three Mile Island power station in the United States, at British nuclear power stations, and in our country at Chernobyl, even these firms have gradually come to the conclusion that there is a need both for joint development of planned new-generation reactor systems and--this is the main point--for improved training of the staff servicing them, since the human factor is often the critical link in the operation of complex modern technological systems. This new approach shows that the program put forward by the Soviet Union at the special IAEA General Conference this September on setting up an international system for the safe development of nuclear power generation has been understood.

The reports of certain seminar participants contained interesting specific proposals concerning the improvement of the management of the nuclear industry and operators' work. We will be examining those proposals.

[Pershin] Were questions of the development of thermonuclear power generation discussed during the seminar?

[Velikhov] Yes, great attention was devoted to that problem. It must be said that there is long-standing scientific cooperation between scientists of various countries in this sphere, and that this cooperation is at quite a high level. But now we must switch to a new phase--away from scientific cooperation and toward scientific and technical cooperation. Specifically, this can be seen in the adoption of practical measures to implement M.S. Gorbachev's proposal on the creation of an experimental tokamak thermonuclear reactor on an international basis. This idea was supported by the scientists and engineers attending the seminar.

[Pershin] Which of the other spheres of international cooperation among scientists discussed at the seminar look the most promising?

[Velikhov] The Archimedes Project--a project for global monitoring of the environment--is interesting. It serves several purposes. First and foremost it involves the creation of a global network of seismic stations. Such a network is currently being set up on a regional scale by the Americans and Europeans. It is proposed to site these stations worldwide. One of the problems which they could help solve is to ensure full and reliable verification [kontrol] of the ending of nuclear tests. Together with U.S. scientists we have already taken concrete steps in this sphere by setting up corresponding seismographs in the region of the Semipalatinsk experimental test range. It is planned to set up similar instruments in Nevada and link them via satellite.

These systems could also be used to forecast earthquakes, study the structure of the earth's crust, and prospect for deposits of useful minerals. The second part of the project concerns meteorological research.

And, finally, there is the third question, which for a long time has not been given sufficient attention--electromagnetic soundings of the earth's crust. The Soviet Union has achieved considerable results in this sphere and we believe that work on the earth's conductivity could be an integral part of the Archimedes Project. [reply ends]

The meeting participants also discussed a number of other realistic proposals for stepping up international cooperation among scientists, whose implementation would promote scientific progress and the strengthening of peace, confidence, and security.

The seminar announced the setting up of a Nuclear Safety Committee comprising representatives of the USSR, the United States, and China. Its chairman is A. Zichichi, the eminent Italian physicist. The committee, A. Zichichi stated, will work in close contact with major national laboratories and tackle questions such as the best use of nuclear reactors and the prevention of accidents at nuclear power stations.

USSR

ROME CONFERENCE DEBATES NUCLEAR SAFETY

PM131503 Moscow PRAVDA in Russian 12 Nov 86 First Edition p 1

[Own correspondent N. Miroshnik report: "For Peaceful Atom"]

[Text] Rome, 11 Nov--A seminar organized on the initiative of the "Science for Peace" International Committee, which has ended in the Italian capital, was devoted to the development of broad and fruitful cooperation for the purpose of the peaceful and safe utilization of nuclear energy. For 3 days eminent physicists from the Soviet Union, the United States, China, Italy, and other countries discussed vitally important problems like the ensuring of reliable safety at nuclear power stations, ecological aspects of their use, and possibilities of using alternative energy sources, and examined several international cooperation projects.

The seminar announced the formation of a Nuclear Safety Committee which will tackle topical questions concerning the peaceful utilization of nuclear energy. USSR, U.S., and Chinese scientists are on the committee.

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CSO: 5100/10

USSR

VELIKHOB ON SCIENTIFIC COOPERATION IN PEACE STRUGGLE

LD131904 Moscow Television Service in Russian 1530 GMT 13 Nov 86

[From the "Vremya" newscast]

[Text] An international scientific seminar entitled World Cooperation Aimed at Peaceful and Safe Utilization of Nuclear Power has been held in Rome. Here is Yu Vybornov speaking from Rome:

Taking part in this important forum were physicists from the United States, Italy, the FRG, China and Switzerland. The Soviet delegation was led by Academician Velikhov, vice president of the USSR Academy of Sciences. There was an interesting and at times acute discussion about what must be done to ensure that the mighty force of nuclear energy does not turn into a military threat and that it is reliable in its peaceful utilization. Italy's Foreign Minister Giulio Andreotti attended the concluding sitting. He handed over to Academician Velikhov a special prize from the International Science for Peace Committee. The award has been bestowed on the Soviet scientist for his active and fruitful activity in the field of nuclear physics as well as for his great personal contribution to overcoming the consequences of the accident at Chernobyl AES.

So let's hear from the scientists: What can science do today in the struggle for peace?

[Begin Velikhov recording] There are two principal areas here. The first of these consists in the need to destroy means of mass destruction: This is the main thrust today. The second, and no less important area, is to create for mankind a dignified and [velikhov changes thought] guarantee him a happy development and existence far into the future and today for the whole of mankind. In both of these areas science is saying its bit and must say its bit jointly. Cooperation is the most important part and we have discussed it here. We are now cooperating with scientists throughout the world—and with Italian scientists--in both the first and second areas: In the struggle for peace and in the struggle to provide it [as heard] with both the power and all the other essential means for development based on modern scientific achievements. [end recording] [video shows the meeting in progress; Velikhov interviewed]

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CSO: 5100/10

USSR

TASS: UN GENERAL ASSEMBLY APPROVES ROLE OF IAEA

LD120729 Moscow TASS in English 0650 GMT 12 Nov 86

[Text] New York November 12 TASS--The U.N. General Assembly has called for the use of nuclear energy solely with peaceful aims for the benefit of the entire mankind. It unanimously adopted a resolution approving of the activity of the International Atomic Energy Agency (IAEA) and pointing out the need for further enhancing its role in the peaceful uses of atomic energy, strengthening the regime of the safe development of nuclear power engineering, ensuring non-proliferation of nuclear weapons. In the course of the debate, Hans Blix, IAEA director general, delegates of the USSR, the GDR, Mongolia, India, Mexico, Austria, Czechoslovakia and many other countries stressed that the realities of the nuclear space and computer era have confronted mankind with the task of ensuring peaceful uses of the nuclear energy and total elimination of nuclear weapons, which are indissolubly interconnected.

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CSO: 5100/10

USSR

PRAVDA REPORTS ON CSSR NUCLEAR POWER STATION CONSTRUCTION

PM061505 Moscow PRAVDA in Russian 3 Nov 86 Second Edition p 4

[Own correspondent S. Vtorushin dispatch under the rubric "On the Spot Report":  
"The Dukovany No 3 Unit"]

[Excerpts] Prague--"No, you cannot see the reactor," Jaroslav Vokurek, shift leader at the Dukovany nuclear power station told me with a smile. "It is not far away, just 30 meters from here, but it is separated from us by a thick concrete wall."

There were many people in the operating hall of the power station's No 3 unit where we were. Multicolored lights twinkled on the control console. Many of them will go out when the reactor goes into operation. But at the moment the final checks are being carried out on the equipment, and specialists are testing the systems prior to startup.

Various operational questions were being discussed as is usually the case on these occasions, and you could hear Czech and Russian intermingling. The construction of nuclear power stations in Czechoslovakia is carried out in close cooperation with our country and quite a few Soviet specialists are working at every station that is being built.

"The international collective has pledged to start up the power station's No 3 unit by the 69th anniversary of Great October. Work is on schedule," Jaroslav Vokurek said, "there are no deviations from the plan."

The Dukovany nuclear power station is not just the CSSR's second operational nuclear power station. It also represents a completely new level of production organization. The flowline method of construction is being used here which makes it possible to work simultaneously on all the units. This has made it possible to sharply reduce the time needed for installation work and the startup of units.

The CSSR has an extensive nuclear power industry development program. In 1989 the No 1 unit at the Mochovce nuclear power station will go into operation, and in the next 5-year plan the startup of the Temelin nuclear power station is planned. By the year 2000 nuclear power stations are to produce around 50 percent of the country's electricity, as against 15 percent at the moment.

I asked Bohumil Vincenc, director of the Dukovany nuclear power station, whether the accident at Chernobyl AES had affected the mood of the people here. "Mankind's progress cannot be halted, the future belongs to the nuclear power industry," he said. "On the other hand, nuclear power is nuclear power and it has to be handled with the necessary responsibility. The reactors with which our power stations are equipped have proved their high reliability and safety. Western specialists who visited Dukovany this summer were able to see this for themselves. They inspected both the station and its surroundings and came to the conclusion that there can be no mention of radioactive contamination. The station is surrounded by the fields of three agricultural cooperatives. They supply fresh produce to our canteens. Not a single family has left or is planning to leave these villages."

Today Czechoslovakia is not only building nuclear power stations, it is also producing equipment for these stations. This equipment can be seen both at our stations and at nuclear power stations in other socialist countries.

The implementation of such a large-scale program for the construction of nuclear power stations in Czechoslovakia has been made possible thanks to close cooperation with the Soviet Union. Mutually advantageous cooperation in this sphere is developing successfully, and this is borne out by the upcoming startup of the No 3 unit at the Dukovany nuclear power station. The international collective has devoted its labor victory to the anniversary of Great October.

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CSO: 5100/10

USSR

TASS: U.S. REPORTEDLY SOLD HEAVY WATER TO ISRAEL IN 1963

LD102050 Moscow TASS in English 1906 GMT 10 Nov 86

[Text] New York November 10 TASS--The United States stood at the rise of Israel's nuclear programme.

This is pointed out with reference to government papers in a report released by Gary Milhollin, professor at the University of Wisconsin Law School.

The scientist maintains that the United States sold four tons of heavy water to Israel in 1963.

THE NEW YORK TIMES newspaper points out in this connection that it was precisely at that time that an Israeli nuclear reactor began to function at Dimona.

The newspaper specially draws attention to the fact that by means of that reactor Israel is suspected to produce materials for the development of nuclear weapons.

According to press reports, it has become known that the Dimona reactor is much higher-powered than was hitherto reckoned, and that it produced such an amount of plutonium which would suffice for the production of a hundred units of nuclear weapons.

THE NEW YORK TIMES writes that the Reagan administration's official spokesman who is in charge of the proliferation of nuclear technology in the world has confirmed Mr Milhollin's report.

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CSO: 5100/10

USSR

COOPERATION WITH U.S. IN NUCLEAR POWER ENGINEERING

LD242243 Moscow TASS in English 2200 GMT 24 Nov 86

[Text] Moscow, 24 Nov (TASS)--The U.S. company Westinghouse made some 30 proposals to its partners in the USSR on cooperation in such areas as technology and equipment for atomic power stations, safe operation of atomic power stations, the technology of nuclear fuel production. The firm's regional market manager Brian Delle Donne said this at a seminar on atomic power engineering which opened here today. The seminar is sponsored by the USSR State Committee for Science and Technology and the U.S.-USSR Trade and Economic Council.

Brian Delle Donne said the Soviet Union had achieved impressive successes in the creation and operation of nuclear reactors. At the same time, more than half of the number of nuclear reactors operating in countries with market economy had been created on the Westinghouse technology.

The U.S. and Soviet programmes of nuclear power engineering have so far been developing independent of each other. A stage of development has apparently been reached now in which cooperation of nuclear power engineers is indispensable, he said. This refers above all to a safe operation of atomic power stations and technology of preventing accidents such as those that happened at the Chernobyl atomic power station in the USSR and Three-Mile Island power station in the United States.

The proposals made by the Westinghouse firm envisage the possibility of exchange of experience in the sphere of development and operation of pressurized-water reactors, the implementation of joint projects on a turn-key basis in third countries, the possibility of creation of joint enterprises for the manufacture of products, that would be competitive in the world market, for instance, small-size steam turbines, Brian Delle Donne said.

The seminar will last till 26 November.

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CSO: 5100/014

NUCLEAR WEAPON PRODUCTION IN PAKISTAN

Moscow PRAVDA in Russian 22 Sep 86 p 5

[Article by Aleksandr Filippov: "Nuclear Ambitions: Our Commentary"]

[Text] Pakistan is in a position to begin producing nuclear weapons as early as next year. This is the view of a number of prominent Western specialists who have appeared recently in the American press. Not long ago, they point out, Islamabad succeeded in taking yet another step in the uranium enrichment process, conducting tests on a detonation system.

In this connection, the foreign press reminds its readers that Pakistan took the decision to acquire nuclear weapons as early as the start of the seventies, not long after its unsuccessful military conflict with India. It was precisely then that Pakistan obtained from the West the equipment and technology required to build an atomic bomb. In the small town of Kahuta in the north of Pakistan, a modern atomic complex was created under the sign "Center for Research into Nuclear Energy for Peaceful Purposes." Here, extensive research and design work has been proceeding under conditions of extraordinary secrecy.

It goes without saying that Pakistan would never have been able even to come close to building a nuclear weapon by itself if the United States had not offered Islamabad comprehensive military and economic aid. Recently, the U.S. made a commitment to supply over four billion dollars in aid of this kind over six years. At the same time, the American administration claims that military and economic support for Islamabad is supposedly capable of... restraining its nuclear ambitions!

We can only hope Washington doesn't miscalculate! Nonetheless, Washington has removed Pakistan from its list of countries covered by the "Symington Amendment," which prohibits military shipments to states which produce or intend to produce nuclear weapons. The reason for American indulgence is clear. Now the U.S. is counting on Pakistan to act as its tool for achieving its neo-global plans in the Middle East and Indian Ocean region; it is using the Islamabad regime in its covert war against Afghanistan.

In these conditions, Islamabad's aspiration to obtain nuclear weapons can have very dangerous consequences for the situation on the subcontinent, for the international situation as a whole, and for the people of Pakistan themselves. People of good will should not relax their vigilance!

FRENCH DEFENSE MINISTER ON NEUTRON BOMB

PM201150 Paris LE MONDE in French 13 Nov 86 p 12

[Jacques Isnard report: "Mr Giraud Makes Cryptic Remarks on Manufacture of Neutron Bomb"]

[Text] The decision to manufacture the enhanced radiation weapon (otherwise known as the neutron bomb) rests with the Defense Commission and the conclusions reached by that body, chaired by the head of state, may be kept secret. This is what Defense Minister Andre Giraud said in cryptic terms to deputies from the defense commission who were questioning him on the future of such a weapon within the French panoply of pre-strategic deterrent weapons.

This clearly amounts to saying: If the decision to manufacture the neutron bomb has already been made or if it still has to be made the cabinet does not have to discuss it nor does parliament, not even in the forthcoming debate on the military programming law. The decision, whatever it may be, does not have to be announced.

Since France experimented with and completed the development of the neutron bomb under Valery Giscard d'Estaing's presidency, the debate on the value of this weapon has continued. As is known, the enhanced radiation weapon is a thermonuclear weapon specially designed for use on the battlefield to release high-energy neutrons produced by the explosion preferentially over the thermal radiation (heat effect) and the shock wave (blast effect) produced by any nuclear reaction on the ground.

French governments have explained several times in the recent past that the scientists know how to produce this weapon and that the only initiative which still needed to be taken was a decision on the manufacture of an operational weapon, not necessarily in large numbers.

Addressing the National Assembly Defense Commission, Mr Giraud made statements which were, to say the least, enigmatic on three points. First he reaffirmed that the enhanced radiation weapon is a munition and not a weapon system. Second, he stressed that the cost of the neutron munition does not affect the cost of the weapon system which is equipped with it. Finally, he said that the decision to manufacture it rests with the defense council, whose decisions may be kept secret.

When they were in opposition, Jacques Chirac and Andre Giraud made no secret of the fact that they were in favor of France adopting the neutron bomb. Although he has made qualified statements on this subject, the head of state has always linked the future of this weapon in the French panoply with developments in East-West relations in the arms sphere.

When he was appointed defense minister after the March elections, Mr Giraud appointed as general delegate for armaments Jacques Chevallier, former director of the military applications section of the Atomic Energy Commission, who is not only a resolute supporter of the neutron bomb but who also helped to develop it in Mururoa. Mr Chevallier compared the invention of the neutron bomb to combat tanks with the invention of the machine gun to combat infantry troops.

Addressing the Higher National Defense Studies Institute on 12 September, the prime minister mentioned the need for France to have "diversified" prestrategic weapons (which implies a range of nuclear munitions) to halt the impetus of an aggression (which presupposes weapons which have a specific military effect on the battlefield, as the neutron weapons does by nature). This reference to nuclear weapons having "their own military efficacy," in addition to the deterrent effect of the threat to use them, is included in black and white in the annex to the 1987-1991 draft military programming law.

It is known that the general staffs proposed to arm the army's new Hades surface-to-surface prestrategic missile with the neutron weapon. If that happened, the Hades missiles would not just be equipped with neutron bombs, but could carry other classes of nuclear weapon already in service.

Addressing the Defense Commission deputies, Mr Giraud said that in addition to providing an aggressor with a final warning before the use of strategic weapons, the Hades missile ought to be capable of inflicting "significant damage" on an enemy through the military efficacy of its warheads. The first Hades regiment is to be ready in 1992. The minister's deliberately cryptic remarks seem to be intended to accustom public opinion to the prospect of France manufacturing the neutron bomb.

/9274  
CSO: 5200/2454

FRANCE

'CONTROVERSIAL' NUCLEAR PLANT BEGINS OPERATION

HK140114 Hong Kong AFP in English 0025 GMT 14 Nov 86

[Text] Cattenom, France, Nov 14 (AFP) — The first nuclear reactor at the controversial Cattenom plant began supplying electricity to France's national grid Thursday, reliable sources said. The reactor is operating at 10 per cent of its capacity and will also feed electricity to neighbouring countries. It should come fully on stream by early 1987.

The power plant, which is only 10 kilometres (six miles) from the West German and Luxembourg borders, has been the subject of weeks of protest by ecology groups as well as the Luxembourg Government.

Luxembourg Prime Minister Jacques Santer said the potential fallout from an accident at the 1,300-megawatt plant was "terrifying".

Anxiety about safety has increased since the April 26 nuclear disaster at Chernobyl in the Soviet Union.

The Cattenom plant is the eighth of its size in France and is among the most powerful in Europe.

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CSO: 5100/2414

FRANCE

GOVERNMENT CONTINUES NUCLEAR TESTING IN SOUTH PACIFIC

Blast Recorded

HK130344 Hong Kong AFP in English 0331 GMT 13 Nov 86

[Text] Wellington, Nov 13 (AFP) — France exploded another nuclear device at its Mururoa Atoll underground test site in the South Pacific Thursday, New Zealand Government seismologists announced here. The blast, with a yield of 20 kilotons, was recorded by seismological equipment at 6:02 am New Zealand time Thursday (1702 GMT Wednesday), they said.

Government seismologist Warwick Smith said the blast was the first at the South Pacific test site since a series in April and May this year, when devices with yields ranging from two kilotons to 30 kilotons were tested. Thursday's blast is the 83d carried out at Mururoa by France since it took its test programme at the Atoll underground in 1975. New Zealand scientists recorded the largest underground blast at Mururoa Atoll in July 1979, when a 140-kiloton device was exploded.

There was no immediate reaction in NWND [expansion unknown], which traditionally has strongly condemned the French nuclear programme.

Third Nuclear Test Conducted

NC072136 Paris AFP in English 2110 GMT 7 Dec 86

[Text] Wellington, Dec 7 (AFP) — France has conducted another nuclear test at its underground site off Mururoa Atoll in the South Pacific, New Zealand Government seismologists announced Sunday, the third such test in the past month.

Scientists at the New Zealand seismological station at Rarotonga, on Cook Islands, detected the underground explosion at a force of about 10 kilotons at 6:10 A.M. New Zealand time on December 7 (1710 GMT on December 6).

The explosion, the 85th France has carried out since it began underground testing at the Atoll in 1975, follows two early last

month with yields of six and 20 kilotons respectively.

Observers said Rarotonga estimates of yields were usually accurate, as the station was the closest to the test site.

The test is believed to be another in the annual "summer" test series, which normally begins in October and runs through early December.

New Zealand Government seismologists are expecting another one or two tests in the current series. France also usually conducts a series of four or five tests in April and May each year.

SPAIN

CSN INSPECTORS INVESTIGATE REACTOR MAINTENANCE AT ASCO

Madrid EL PAIS in Spanish 27 Aug 86 p 11

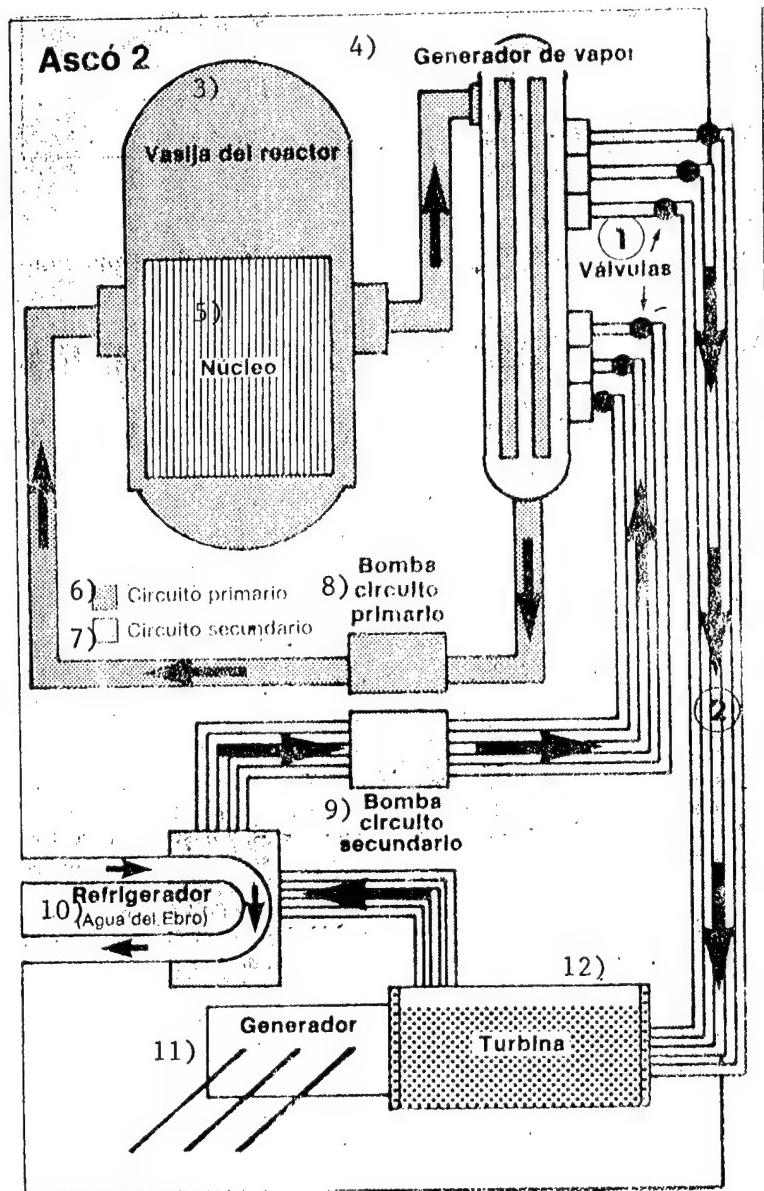
[Text] Barcelona--The inspection team sent to the Asco 2 nuclear powerplant by the Nuclear Safety Council (CSN) is investigating, among other things, "the performance of the operation and maintenance teams of the powerplant, as well as the remaining technical services," according to a note made public yesterday by the aforementioned agency. The CSN is proceeding, through the aforementioned inspection, to make an exhaustive review of the circumstances under which the shutdowns of 1 and 23 July took place, considered as the antecedents of the present shutdown. The investigation, according to the communique, "will necessarily be slow, given the complexity of the components to be examined."

The CSN has sent two inspectors to the Asco 2 installations. One of the technicians sent to the powerplant is Jose Ignacio Villadanigo, considered the highest technical authority of the CSN on water powerplants. The communique from the Council points out that the investigation underway will take place throughout the week, "its result will be presented to the full CSN so as to study whether it is proper to begin operations in the powerplant again."

Hot Shutdown

The Asco 2 nuclear powerplant is now in the status of a hot shutdown, ready to go into operation and not completely stopped, reports EUROPA PRESS. In technical terms, the status of hot shutdown is called "Mode 4." If the CSN inspection lasts a week--according to management sources of the powerplant--it would be necessary to go to "Mode 5" the cold shutdown status.

According to the same sources, in the first period after it went into operation, the first group of this nuclear powerplant--Asco 1-- reported 18 triggered warnings, compared to the 11 Asco 2 has had. In the latter nuclear powerplant, management circles have expressed surprise at the CSN decision to order the hot shutdown. Elsewhere, the reloading of Group 1 of Asco has already ended with the replacement of one third of the reactor uranium.



**Key:**

1. Check valves for water supply (secondary circuit). The water supply of this circuit enters the steam generators.
2. The water, now converted into steam, emerges toward the turbines through the three valves. In case of damage or emergency, these valves should close to isolate the containment building, preventing the emergence of the steam that may have become contaminated toward the turbines.
3. reactor vessel
4. generator

- 5. core
- 6. primary circuit
- 7. secondary circuit
- 8. primary circuit pump
- 9. secondary circuit pump
- 10. cooling chamber  
(water from the Ebro)
- 11. generator
- 12. turbine

8908

CSO: 5100/2575

SPAIN

MALFUNCTION OF SAFETY SYSTEM LED TO REACTOR SHUTDOWN

Madrid EL PAIS in Spanish 27 Aug 86 p 11

[Article by Lola Tara: "The Nuclear Safety Council Ordered the Shutdown of ASCO 2 when it was Noted that one of the Safety Systems was not Operating"]

[Text] Tarragona--The failure of the mechanism that activates feed valves, discovered last Saturday at the Asco 2 Powerplant, allowed confirmation later that in case of a serious emergency one of the emergency systems of the plant would not have functioned. This was a system regulated by the three main steam check valves. This latest irregularity, discovered when the powerplant was already out of service because of the Saturday failure, was the reason for the indefinite shutdown ordered by the Nuclear Safety Council (CSN).

After the decision by the agency responsible for nuclear safety, Powerplant Asco 2 is technically in "Shutdown Mode 4," which is the same as a hot shutdown. If the powerplant were to remain inactive for a long period of time, it should go into "Mode 5", which means cooling off the reactor. In this case, the subsequent start up would be more costly. CSN inspectors have gone to Asco to head investigations, as has technicians of the U.S. company, Teledine Monroe, which manufactured the mechanisms that activate the valves.

The malfunction detected in the mechanism that activates the valves is particularly serious because these parts have the capability of isolating the steam generators located in the containment building (where the entire primary circuit is located, which means the strictly nuclear part) from the rest of the installations. In the hypothesis that there were a leak of radioactive substances and the secondary circuit were to be contaminated, these would not remain within the containment building but would emerge toward the turbine steam pipes, according to sources of the powerplant.

The containment building contains, in addition to the nuclear reactor, three steam generators which turn the water that circulates through the secondary circuit into steam, which activate the turbines. These turbines are connected to an alternator that turns that energy into electricity, which is supplied to the grid.

### Three Circuits

The process through which the nuclear reactor turns heat energy produced by the fission of uranium into electricity, includes the participation of three different circuits. The first, which is strictly nuclear, is that flow that takes place between the reactor and the steam generators. Water contained in this closed circuit, because of the effect of the high heat from the reactor, is at a temperature of more than 300 degrees centigrade, although it remains in a liquid state because it is subjected to a high pressure from a device known as a pressurizer. Subsequently, it circulates through some pipes which run through the interior of the steam generator and come into contact with the cold water circulating through the secondary circuit, which is also a closed circuit. That water, already converted into steam, comes out of the containment building and powers the turbines.

The third circuit, the only one of an open nature, is that which takes water from the Ebro River which in turn cools the steam, and once it has been used by the turbines, is condensed once more until it reaches its initial liquid state, thus remaining ready to come into contact with the pipes of the steam generator again, repeating the previously explained flow.

### The Mission of the Valves

The irregularity detected for the second time last weekend, after the first which took place on 1 July, in an extreme case could allow the escape of radioactivity from the primary circuit to the outside of the containment building. The mission of the three main steam valves is that of closing in case that different levels of pressure in the three conduits carrying the steam to the generators is detected. The meaning of that supposed increase in pressure could be that there is a large leak in the primary circuit that is contaminating the secondary circuit. It is for this reason that any irregularity in pressures of those flows means the immediate closing of the three main steam check valves, which would in this way keep the hypothetical radioactive lead within the containment building.

Two of these three valves failed on 1 July and one of them once more began to operate in an irregular manner. Because of this, and given the repeated irregularity of operation and the importance of these valves in one of the safety systems of the powerplant, the CSN has forbidden it to resume operations until the cause of these failures is found.

Flix Mayor Pedro Munoz, has requested a meeting of the regional Civil Defense Council, a body that includes the mayors of the municipalities of the area of Asco located in a radius of 10 kilometers from the powerplant. In addition to the mayors of Asco and Flix, the council includes those of Vinebre, Torre de l'Espanyol, Riba-Roja d'Ebre, La Fatarella, Garcia, Mola, Palma d'Ebre, Mora d'Ebre, Mora la Nova, la Figuera and Corbera d'Ebre. The body, which is headed by the civil governor of Tarragona, Vicente Valero, met for the last time on 22 August 1985.

8908

CSO: 5100/2575

TURKEY

ATOMIC ENERGY COMMISSION CHIEF EXPLAINS POLICY

Istanbul CUMHURIYET in Turkish 16 Sep 86 p 16

[Text] Ankara -- Chairman of the Turkish Atomic Energy Commission (TEAC) Professor Ahmet Yuksel Ozemre stated that the current panic in the Black Sea region over hazelnuts derives from sources other than themselves. Confirming the views of commission officials that radiation in hazelnuts has not reached danger levels, and that due to Chernobyl there has been increased radiation in almost everything Ozemre said, "Our commission issues export permits directly to individuals."

Speaking yesterday at the meeting of the Advisory Council of the Turkish Atomic Energy Commission, Professor Ozemre responded to charges by some hazelnut growers in Ordu and Giresun that no export permits had been received. He stressed that export permits were issued by TEAC not only for hazelnuts but for other crops as well. Asking, "If no export permits have been issued how would exporting be possible, or has there been no exports at all until now?" Ozemre drew attention to the point that, after Chernobyl, some countries have tried to use the radiation issue for obstructing one another. He added, "We are not a member of the Common Market yet. Spain, on the other hand, is a recent member. We should not forget that in hazelnuts Spain is our greatest rival," reminding that another rival happens to be U.S. Ozemre also noted that the number of applications for radiation tests submitted to them for various crops has now reached a thousand, and they were trying as best as they can to carry out those tests. "I say categorically that our tobacco is absolutely clean, and any radiation in our hazelnuts does not reach danger levels," said Ozemre. He added that the Chernobyl accident had never reached 'disaster proportions' as far as Turkey was concerned, and this was largely due to weather conditions during those days.

Speaking at the first TEAC Advisory Council meeting of the year, Professor Ozemre told the audience about the work of the commission and the policy followed during the Chernobyl accident. He noted that during that period there had been individuals, some

responsible and some certainly not, coming up with a host of ideas, with some scientists presenting arguments not quite compatible with science. Ozemre said:

We were all astonished to see so many nuclear experts suddenly springing up from everywhere. It was strange that during the accident or its aftermath no academic or health organization requested any radiation figures. Only the journalists consulted us. As it was, we were quite prepared to give those figures to any organization capable of interpreting them.

Noting that the Chernobyl accident has led to great panic in many countries Ozemre stated that, apart from a few individual instances and apprehensions, there was no "collective hysteria" in Turkey. "For us, Chernobyl has provided the occasion to evaluate and know ourselves. This gigantic slap in the face has reactivated the latent capacity in a dynamic way." From the moment the accident was heard all personnel, particularly the 42-member team, started working with an incredible selflessness, making extraordinary use of limited resources. Ozemre continued as follows:

This team, working mainly to the west of the Sinop-Anamur line but in other areas as well, expended great efforts and managed to take all the necessary measurements. About 50,000 measurements and 3,000 analyses were made and over 28,000 miles were covered in the most forbidding circumstances. Therefore, I am extremely proud of this team and I congratulate them. Our commission has got 8 out of 10 in the Chernobyl test.

The policy followed during the Chernobyl accident was "to avoid creating panic among the public, and if there was a situation that might cause panic immediate measures were to be taken, and daily readings were to be transmitted to relevant authorities in the quickest way possible." France and Switzerland followed similar policies thus avoiding panic, but the greatest panic was experienced in Federal Germany and Austria. "In these countries there were political reasons. The Greens' floating votes forced the government to undertake a plethora of anti-radiation measures. As it turned out, the day after the election of Kurt Waldheim to the presidency news items concerning radiation came to a halt in all media, and the government started wrestling with the monster it had created, but in a silent way."

The formation of the Radiation Security Committee after the accident has taken the "political burden" off TEAC said Ozemre, adding that radiation being a very complicated subject publicizing the figures would create great panic among laymen.

Since the latest advisory council meeting two years ago the following activities have been conducted by the commission:

-- In 82, the 'nuclear fuel pilot plant' originally proposed by the Belgians at a cost of nearly TL 3 billion, was accomplished by the commission. Belgians renewed the proposal in 85 but by then the cost had risen to TL 4 billion and the commission, having determined that Turkish personnel were up to the job, rejected the offer. The project which started last year with 45 scientists ended up costing just TL 256 million. Hence the state treasury gained TL 4 billion out of the deal. (The cost includes equipment that are to be imported.) This project also enables us to establish a team that will design the fuel system of the nuclear reactor planned for Akkuyu.

-- Since its founding 30 years ago TEAC has for the first time, sold a technology of its own making to another country. In the coming months new technologies will be sold to Middle Eastern and African countries.

-- In March of this year, the commission manufactured an educational microprocessor to ensure their spread to all disciplines. 62 more units will be manufactured by the year's end. With continuing production some of the microprocessors will be donated to various universities, including the Eastern Mediterranean University.

-- An Advanced Nuclear Research Center will be established at METU campus working jointly with that university. At the campus of the Black Sea University the Eastern Black Sea and Environmental Radiobiology Institute will be established, becoming the first window from the Black Sea region to be opened to the world. And at the Eastern Mediterranean University, the Eastern Mediterranean and Environmental Radiobiology International Research Center will be the first international institute to be established in that region.

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CSO: 5100/2404

**TURKEY**

**TRADE MINISTER, CANADIANS DISCUSS NUCLEAR PLANT**

**TA201630 Ankara ANATOLIA in English 1625 GMT 20 Nov 86**

[Text] Ankara [no date as received] (A.A) — Industry and Trade Minister Cahit Rahal said Wednesday that a nuclear plant may be installed in Turkey.

Cahit Aral, who received Canadian parliamentarians who were here to attend the North Atlantic Assembly meeting, said that the meeting will focus on economic matters.

While talks towards constructing a nuclear plant in Turkey slowed after the Chernobyl disaster, the process is continuing, Mr Aral said.

The Canadian delegation's leader Alan McLean, on his part, said that an agreement might be reached during the talk on the construction of a nuclear plant in Turkey.

A Canadian company, Atomic Energy of Canada Limited, competing with a German firm, has offered Turkey to build a nuclear plant and had signed an intention letter with the Turkish Government on 1983 for the construction of a nuclear plant in Akkuyu.

Negotiations between Turkish and Canadian officials on this issue are being carried on.

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CSO: 5100/2412

TURKEY

CONSTRUCTION OF EXPERIMENTAL FUSION REACTOR REPORTED

Istanbul HURRIYET in Turkish 11 Sep 86 p 4

[Text] Ankara, (A.A.)--An experimental fusion reactor has been built at the Nuclear Research Center in Ankara that is reportedly the ninth biggest of its kind in the world. The reactor has been built within the framework of a project supported by the International Energy Agency and the Turkish Atomic Power Board. Work at the reactor is headed by assistant lecturer Dr Ayten Sinman, head of the Plasma Physics and Controlled Fusion Laboratory at the Nuclear Research Center, and her husband, Prof Dr. Sadrettin Sinman, member of the teaching staff at the Electrical and Electronic Engineering Department of the Middle East Technical University.

Explaining what a fusion reactor does, the Sinman couple said that such reactors will play an important role in overcoming the world energy crisis. They explained that the main principle of obtaining energy from such a reactor is, just as with the sun, the fusion of light elements into heavier ones. They emphasized that there was no danger of radiation from fusion reactors.

13184/9190  
CSO: 5100/2405

TURKEY

HOPE FADING FOR AKKUYU NUCLEAR PLANT

Istanbul MILLIYET in Turkish 22 Jul 86 p 3

[Text] Ankara--AA--A year has passed since an agreement was signed to build Turkey's first nuclear power plant, and it appears that the construction-firm partnership has given up all hope for the project.

The negative view was announced by the words, "It is impossible," of Administrative Council Chairman Sarik Tara of the Enka Construction and Industrial Corporation, the Turkish partner of the consortium led by AECL (Atomic Energy of Canada, Limited), which proposed to build the nuclear power plant at Akkuyu, Silifke.

The nuclear power plant project, which was planned using the model, "Build, operate, transfer," has been almost entirely "put on hold" when, for the past several months, talks held have been "minimal."

Officials state that credit from the Export Development Corporation, Canada's official insurance organization, could not become viable, because the "state guarantee" requested of the Turks in exchange for the \$750 million in credit for the project approved by the Canadian Government could not be obtained.

The nuclear power plant project agreement was signed 14 August 1985 at a ceremony attended by Prime Minister Turgut Ozal. In addition to Enka, the Turkish partner, Neil Parsons, Limited, from England, was part of the consortium headed by AECL, which reported that the power plant would utilize "CANDU" technology based on "heavy water and natural uranium."

Construction costs had been estimated at \$1.3 billion for the 665-megawatt power plant. The plant was to produce 4.5 billion kilowatt-hours of electrical energy per year.

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CSO: 5100/2569

CONSTRUCTION OF AKKUYU NUCLEAR POWER PLANT UNCERTAIN

Istanbul HURRIYET in Turkish 11 Sep 86 p 4

[Article by Muharrem Sarikaya: "Nuclear Power Station in Suspense"]

[Text] Ankara--HURRIYET--Construction of the nuclear power station planned for Akkuyu at Silifke is in suspense following the cold-shouldering of Ozal's "build-operate-transfer" formula by various consortiums. Following the cancellation of the preliminary agreement signed by the Canadian AECL with the Turkish Electricity Board as a result of the AECL's inability to find the necessary credit, it is understood that the German firm KWU--which was next in line--has been trying to get Turkey to modify the "build-operate-transfer" model. An official said: "Both organizations are only willing to adopt such a model after a year's trial; they will not deal otherwise."

It is reported that since the cancellation of the protocol with the Canadian firm in February after it failed to raise the credit envisaged in the agreement, the only bidder for this power station has been the German firm KWU. A highly placed official involved in the matter disclosed that prominent KWU officials have recently visited Turkey to try to get Prime Minister Turgut Ozal to agree to a new formula. The official said: "Both organizations continue to approach us. The Germans and--less frequently--the Canadians sound us out from time to time. The Germans say, 'We have come closer to Turgut Bey's model,' but they do not want to commit themselves to the proposed model completely." The official pointed out that in addition to a 1-year trial period, KWU is asking for a Turkish Government transfer guarantee concerning the power station, and added: "previously, no interest was payable during construction. Now there is a demand for interest payments during the construction period. These are incompatible with the model." He said: "They are neither tightening the ropes, nor loosening them. They nudge us from time to time; that is all."

The official concerned said that so far there had been no offer whatsoever regarding the Akkuyu nuclear power station except from these two organizations, adding: "There is not much competition for the 'build-run-transfer' model in the case of nuclear power stations."

He said: "The British firm NEI Parsons, a partner of the Canadian firm in question, has been among the first applicants for a thermoelectric

station based on imported coal for fuel. It follows that the problem arises not from the model as such but from its application in the case of the nuclear power station."

Meanwhile, it is reported that the Ministry of Energy and Natural Resources prefers "to wait" in the case of the nuclear power station. It is understood that the ministry supports the view that the construction of thermoelectric stations is more attractive and that at the start of a search for a new form of energy "it would be appropriate to embark upon a search for a firm for nuclear power station construction." It has been reported that the ministry has said: "There are seven applications by foreign firms for building thermoelectric stations on the build-run-transfer model. If all of these are approved, there will be no energy problems up to 1994. Nuclear power stations may be more suitable for the period after that." The ministry will accept the construction of a nuclear power station if there is an application under suitable conditions, but it does not want to embark upon a separate search for a firm. An official concerned with the issue, pointing out that the ministry had received no application so far, said: "At one time a particular firm was mentioned, but it did not apply. There is no wish to choose anybody; waiting appears more suitable. And the ministry is not engaged in a search for an entrepreneur."

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